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Center

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Phase 2 Remedial Investigation Report Army Materials Technology Laboratory

**Task Order 1
Remedial Investigation/Feasibility Study**

Contract Number DAAA15-90-D-0009

Volume 3 - Figures

May 1994

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94P-2492

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Task Order 1

**PHASE 2 REMEDIAL INVESTIGATION FOR BASE CLOSURE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ARMY MATERIALS TECHNOLOGY LABORATORY
WATERTOWN, MASSACHUSETTS**

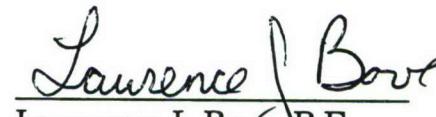
Contract No. DAAA15-90-D-0009

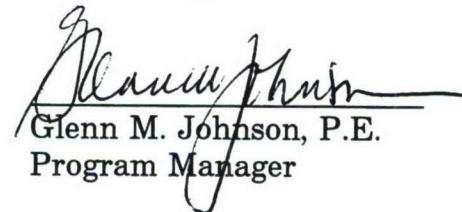
VOLUME 3

May 1994


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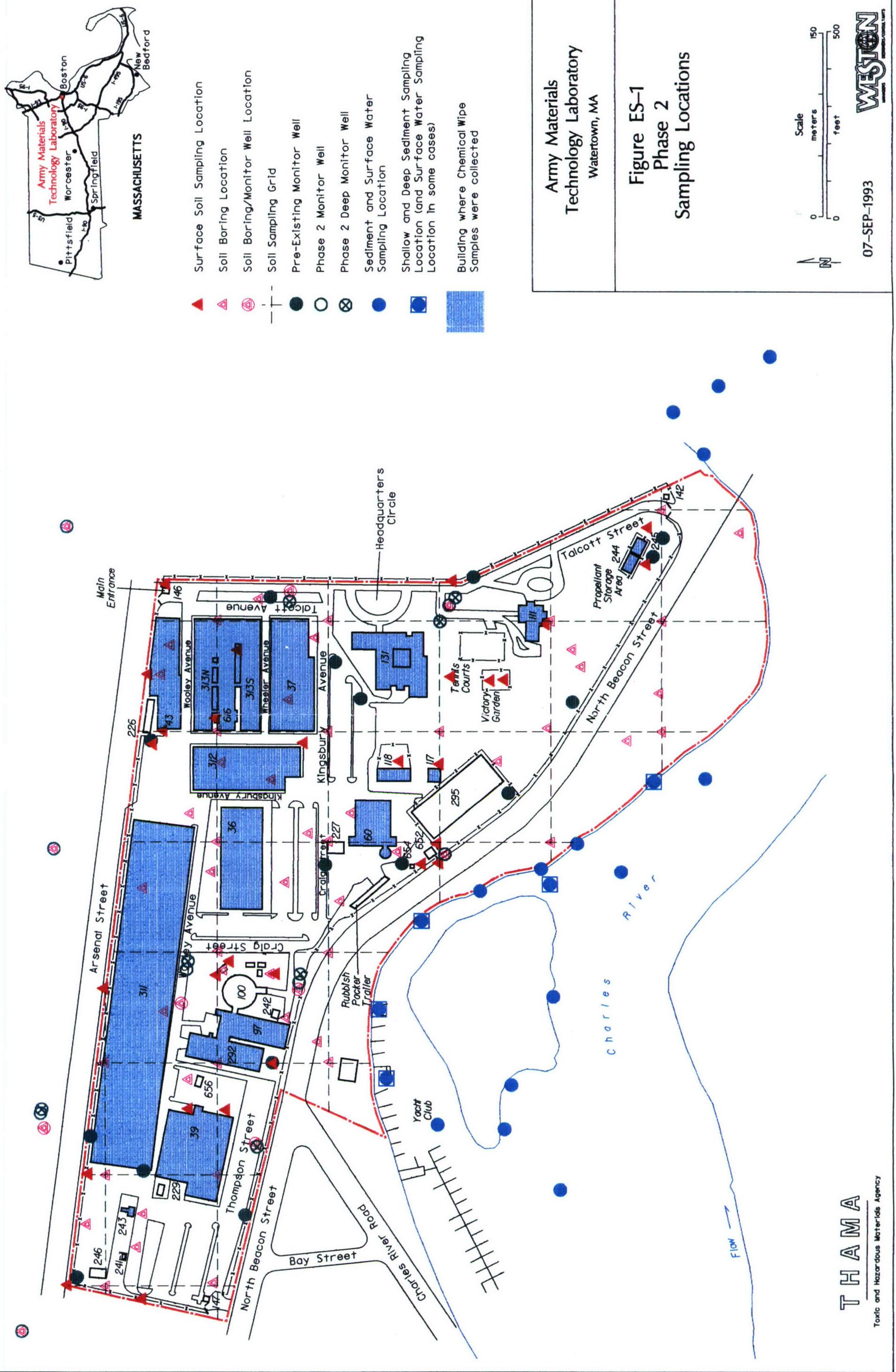
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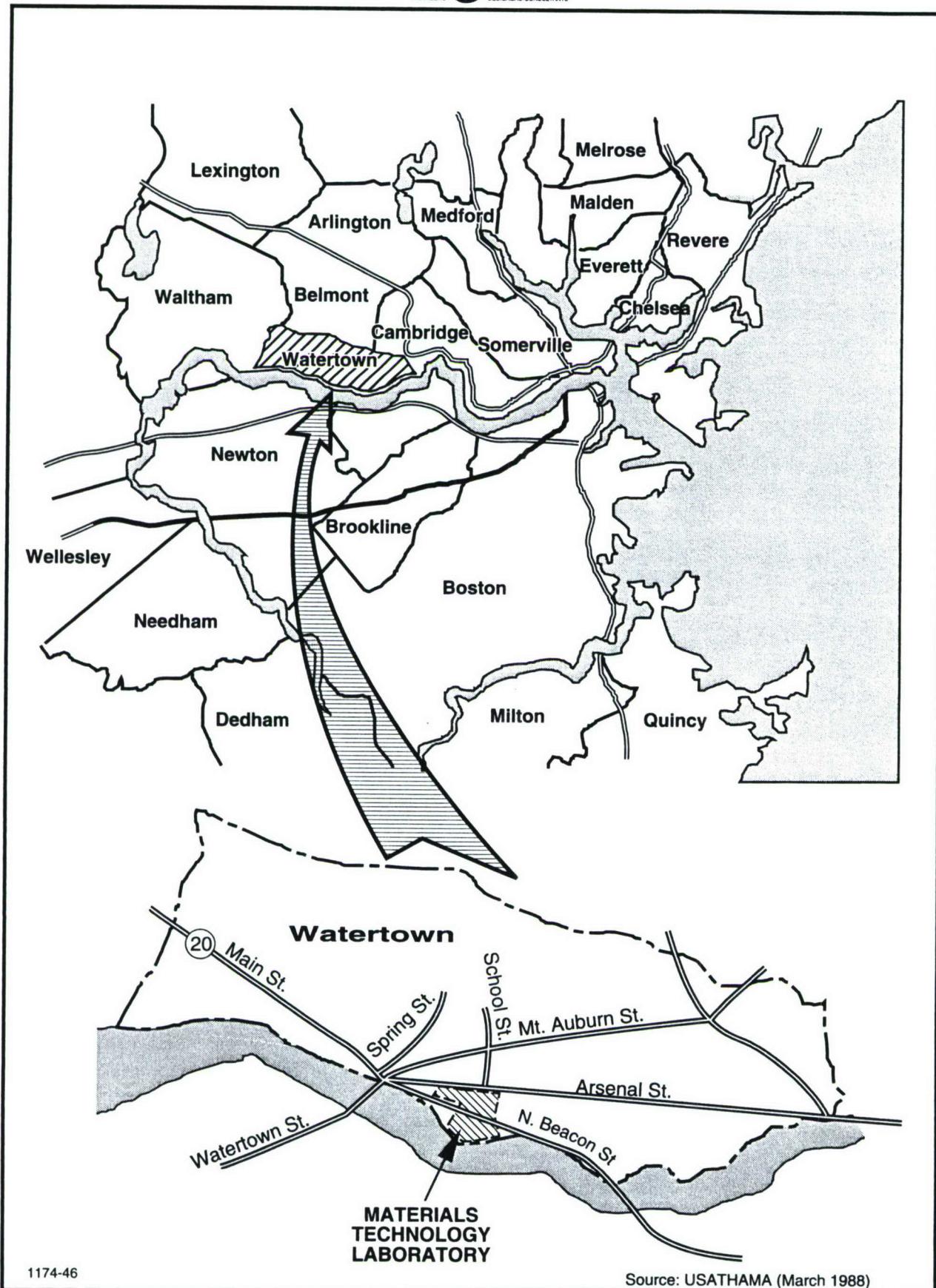


FIGURE 1-1 LOCATION OF MTL

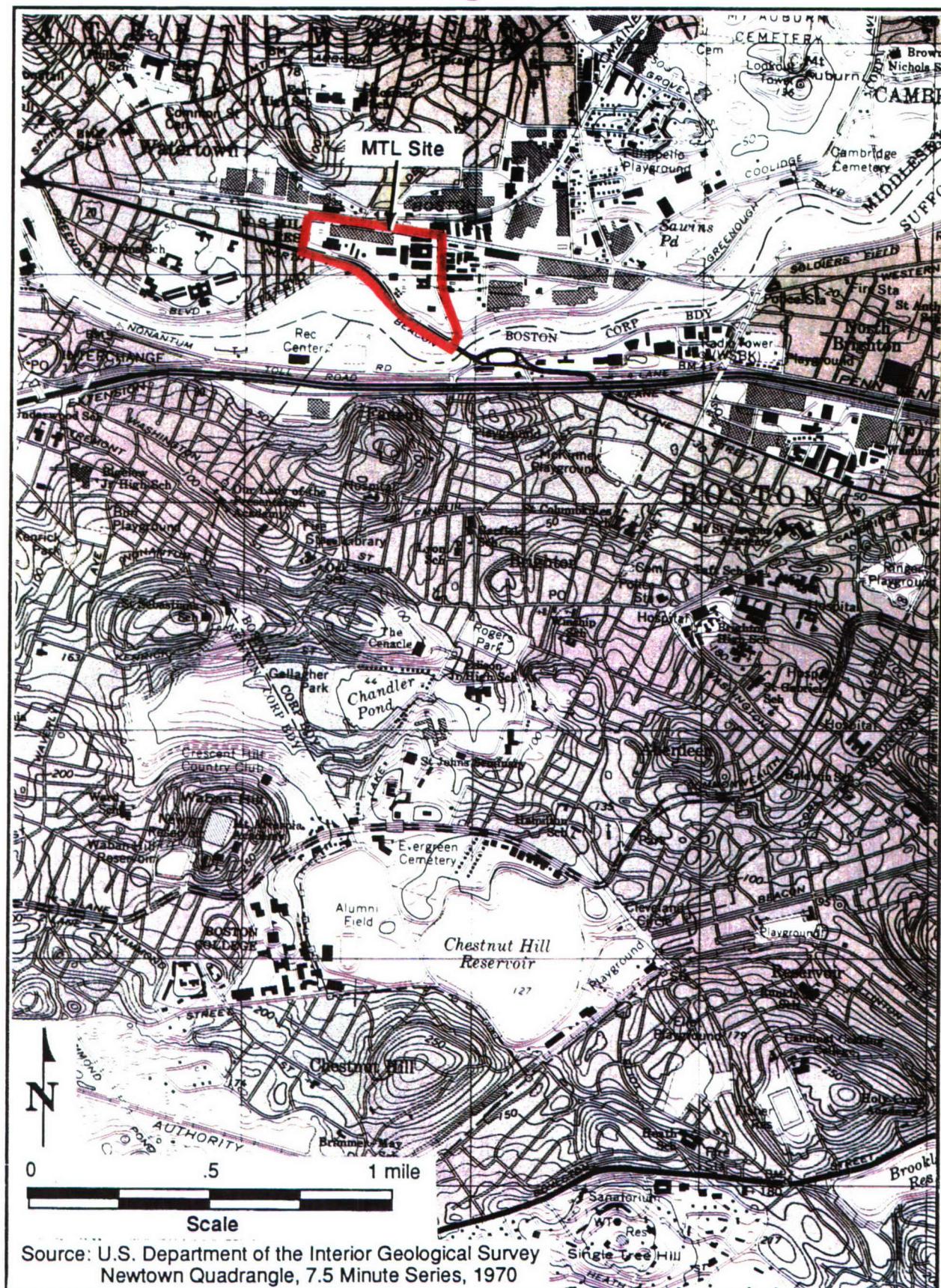
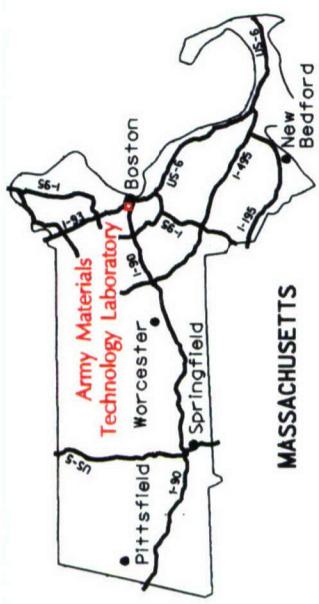


FIGURE 1-2 TOPOGRAPHIC MAP FOR MTL AND SURROUNDING AREA



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Figure 1-3
Geographical
Subdivisions of MTL

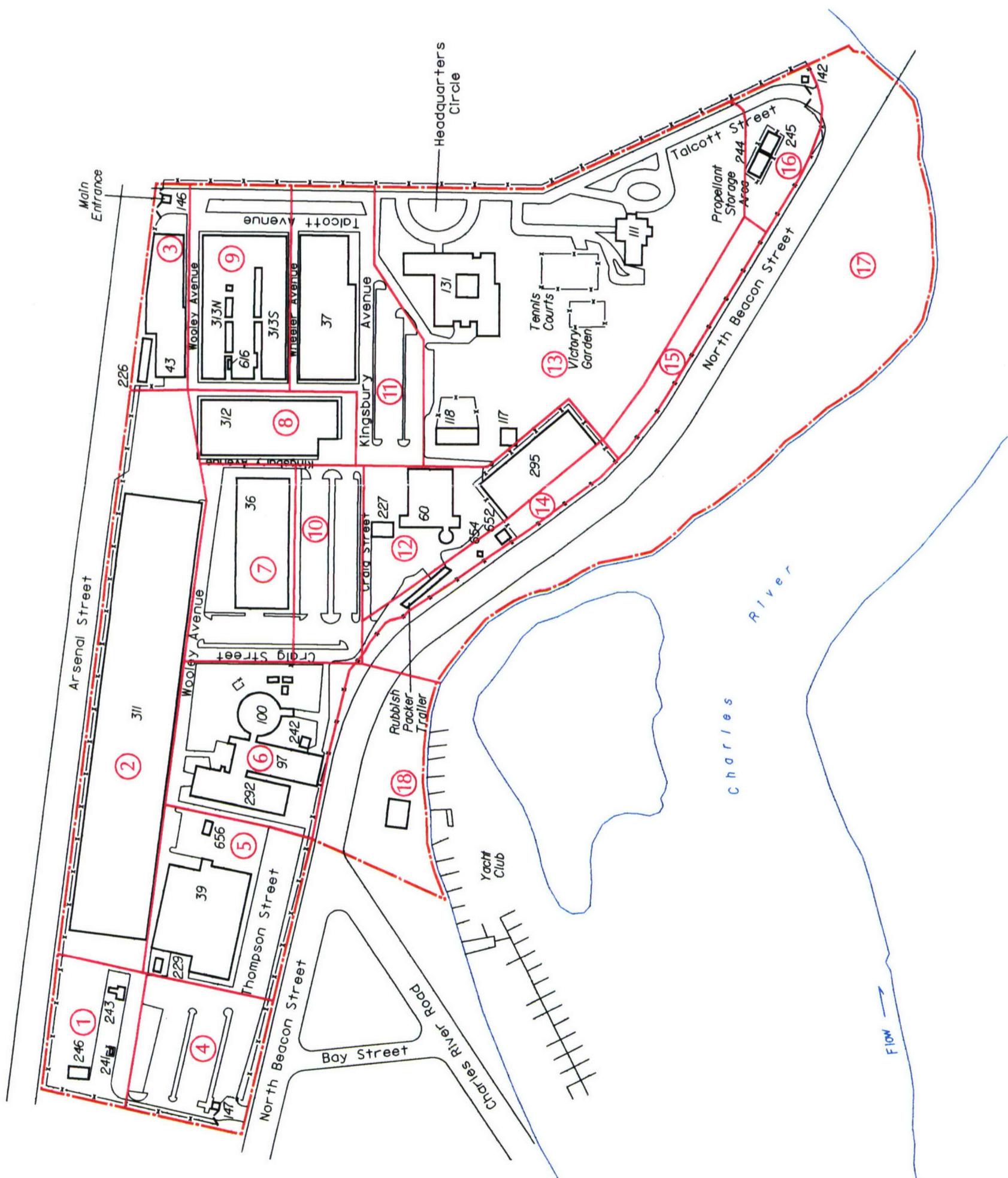
Sampling Unit Numbers
(Source: E.G.&G., 1988)
Sampling Unit Boundary
(Source: E.G.&G., 1988)

Scale
meters
feet
0 500
0 150

07-OCT-1992

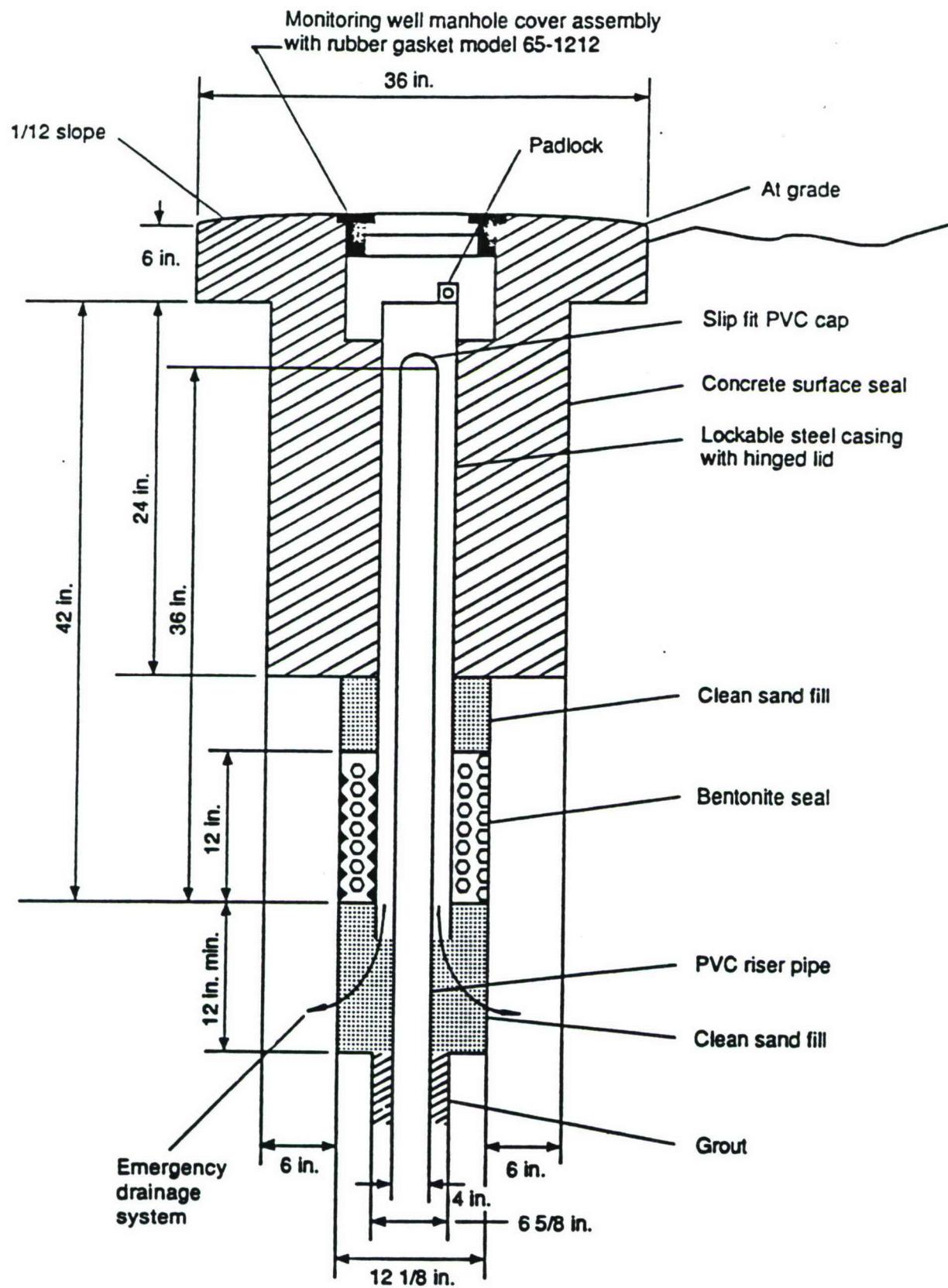
WESTON
Environmental Services

F-4



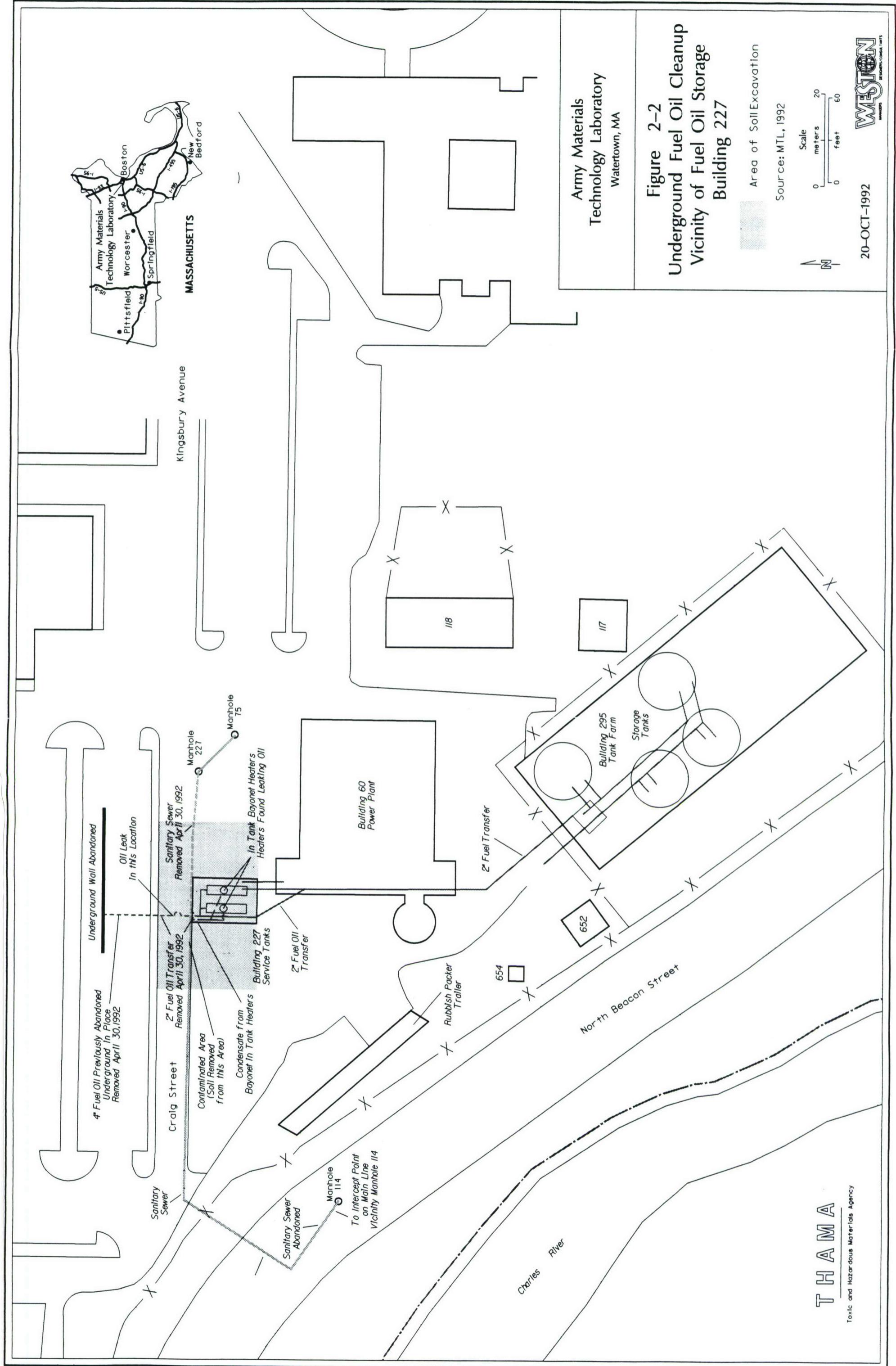
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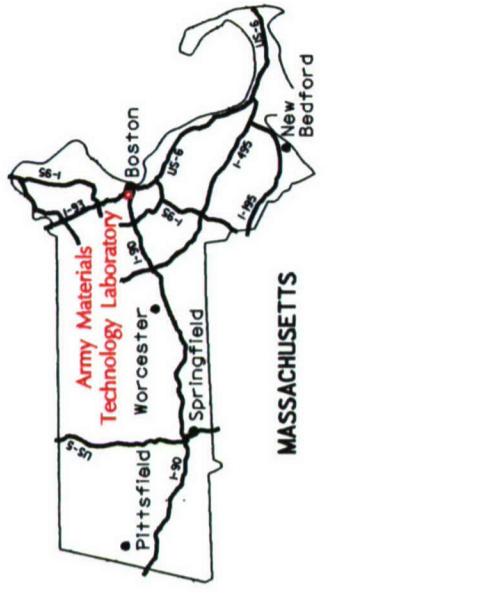
Toxic and Hazardous Materials Agency



Source: EG&G, 1990

FIGURE 2-1 WELL COMPLETION (MANHOLE TYPE)





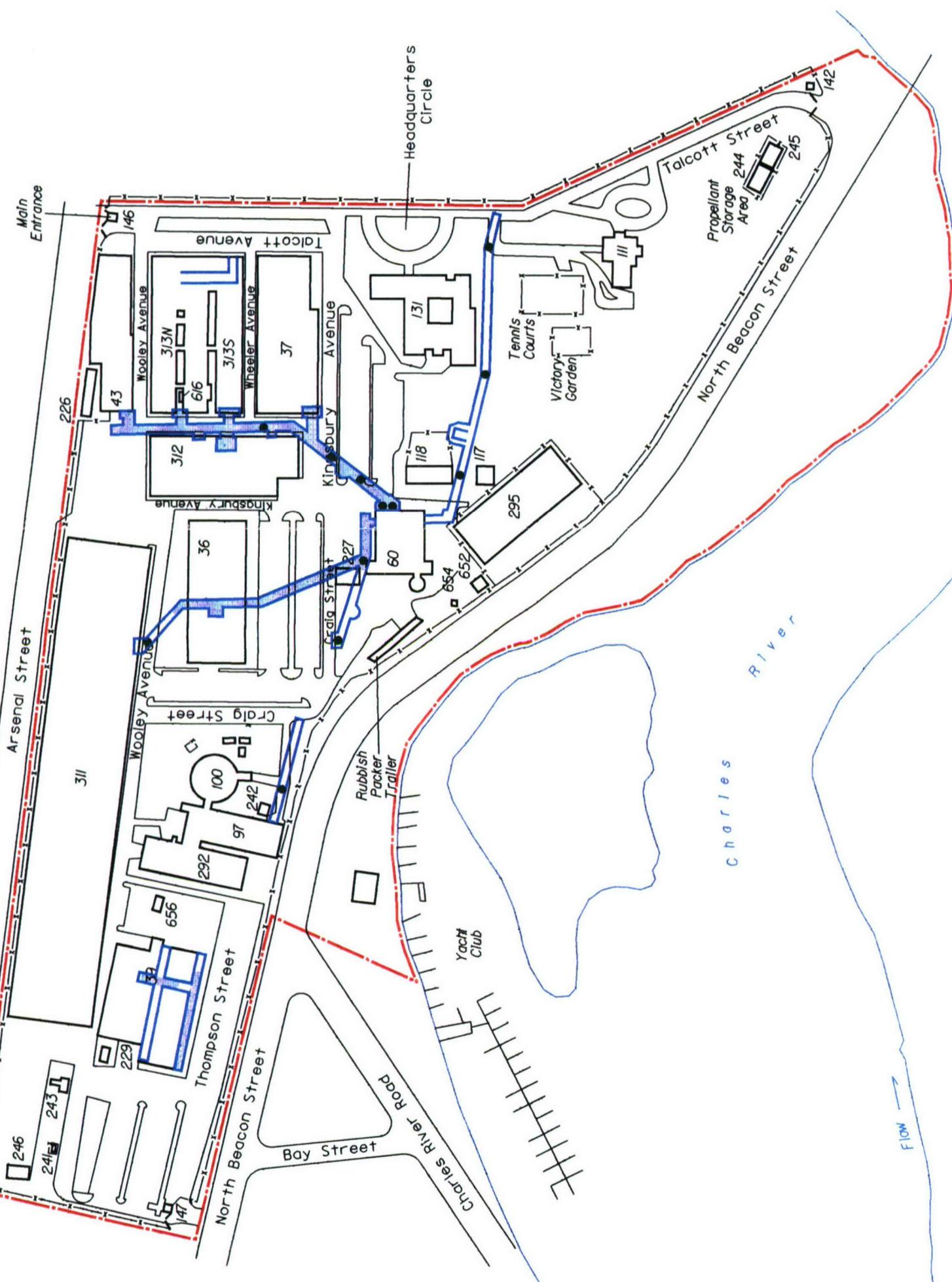
Tunnel Portion Visually Inspected by Weston Personnel

Army Materials Technology Laboratory

Figure 2-3
MTL Tunnel
System

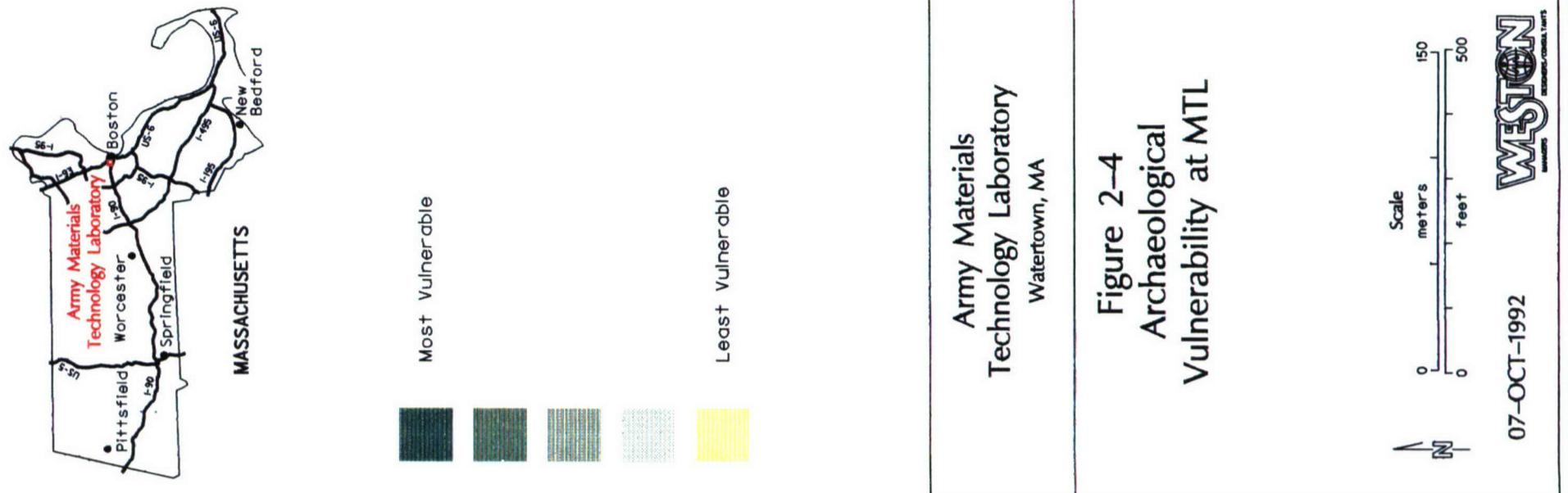
A scale bar and a north arrow are located in the bottom left corner of the map. The scale bar is a horizontal line with tick marks and labels '0' at both ends, 'feet' in the middle, and 'meters' above it. Above the scale bar is a vertical line with tick marks and labels '0' at both ends, '500' at the top, and '150' above it. To the right of the scale bar is a north arrow pointing upwards, with the letter 'N' inside it.

F-7

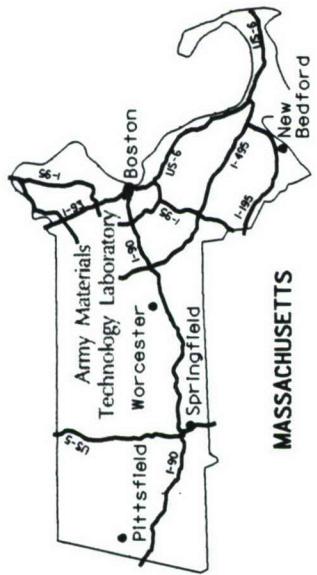


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Watertown, MA

Figure 3-1
Topographic Profile

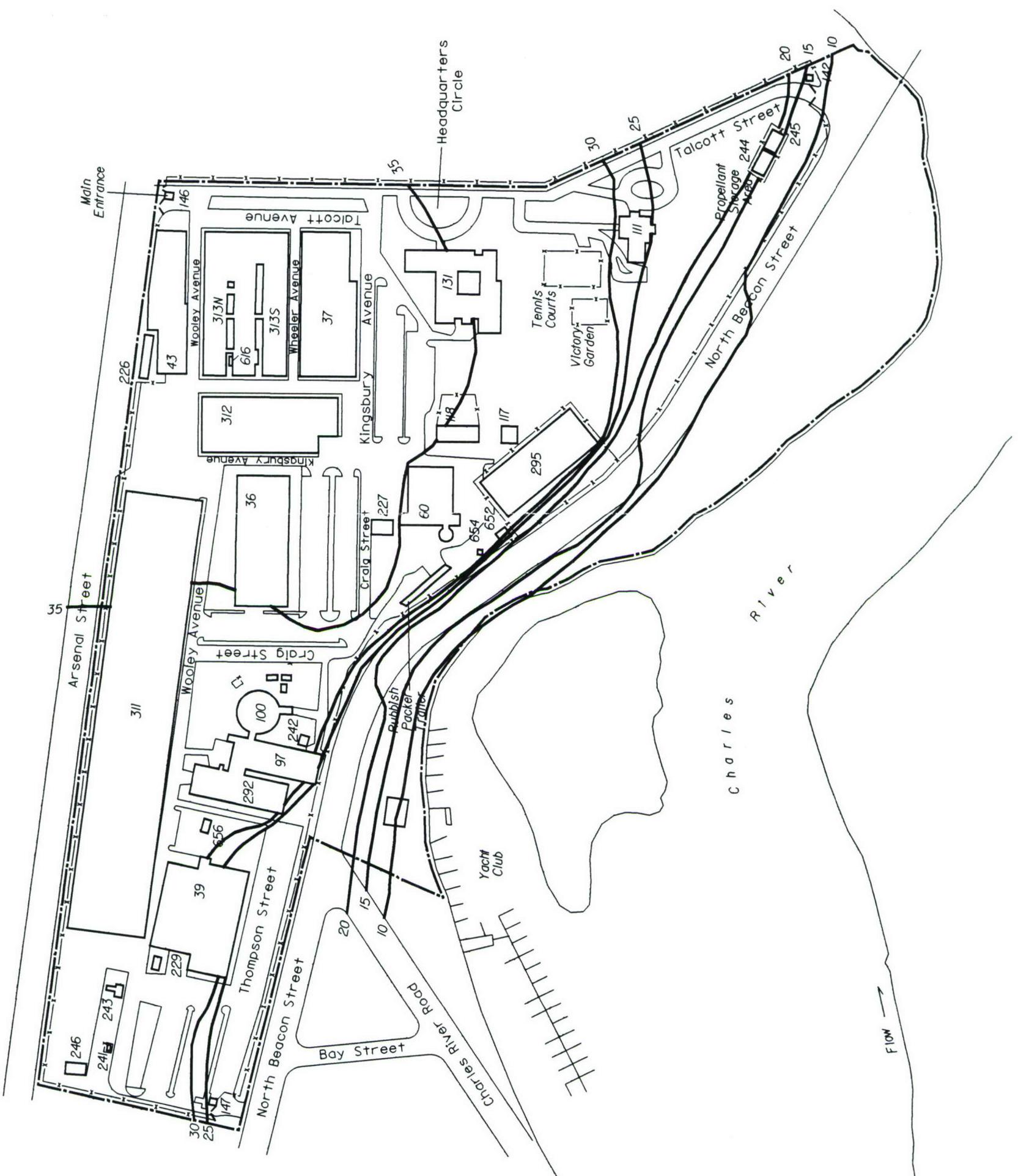
Elevation in Feet
(Above Mean Sea Level)

Scale
meters
0 50 100 150

Toxic and Hazardous Materials Agency

Toxic and Hazardous Materials Agency

Toxic and Hazardous Materials Agency



BOSTON LOGAN INTERNATIONAL AIRPORT
1985 THROUGH 1989
CALMS INCLUDED

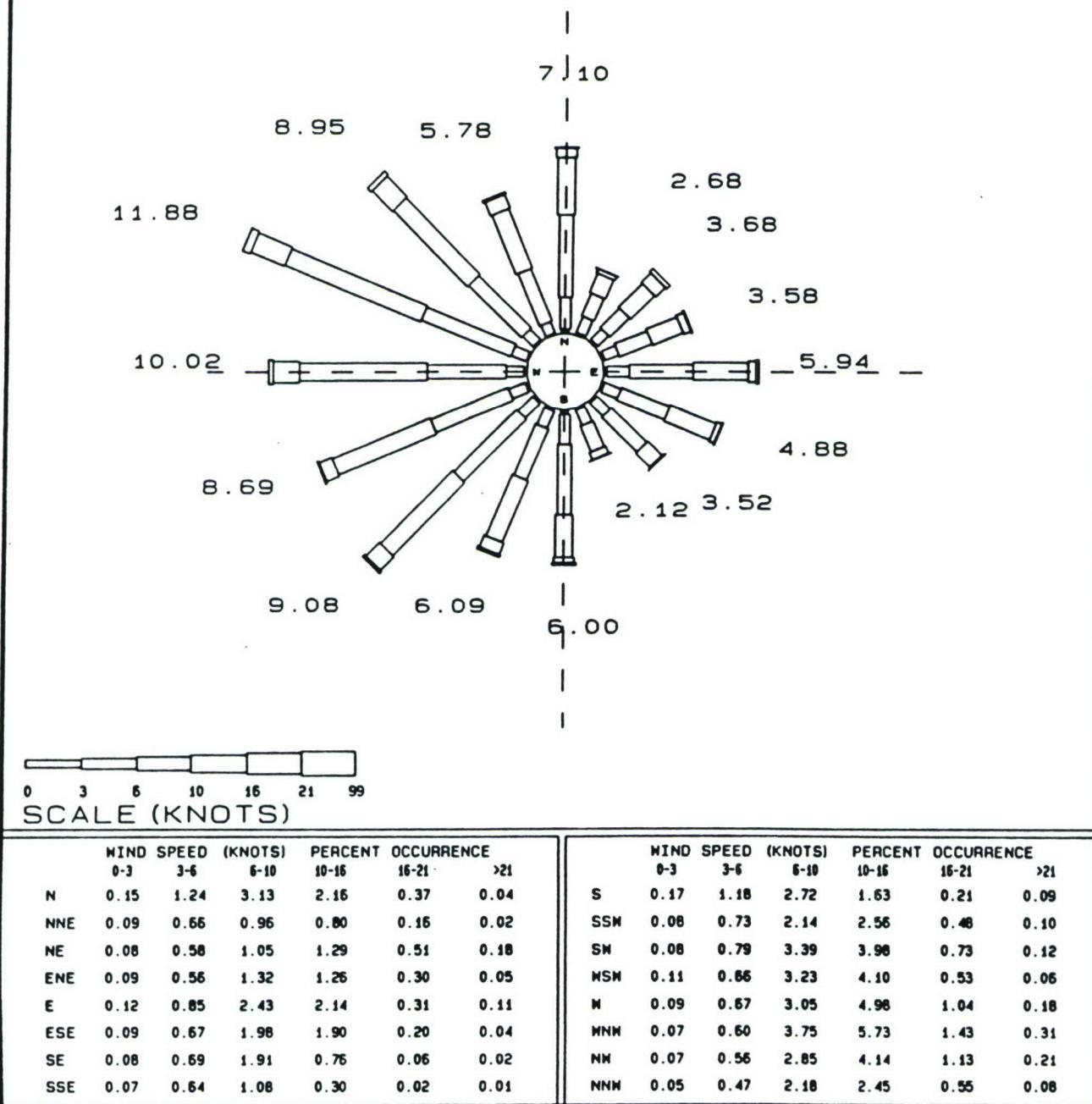
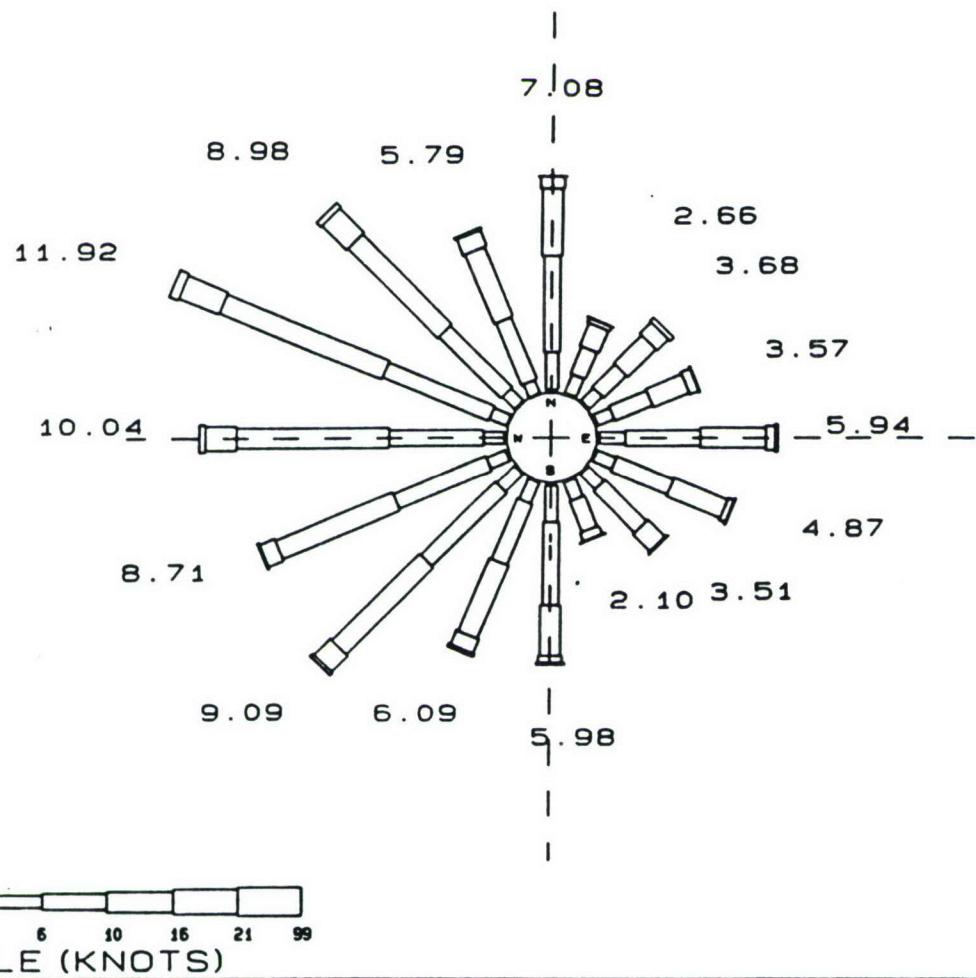


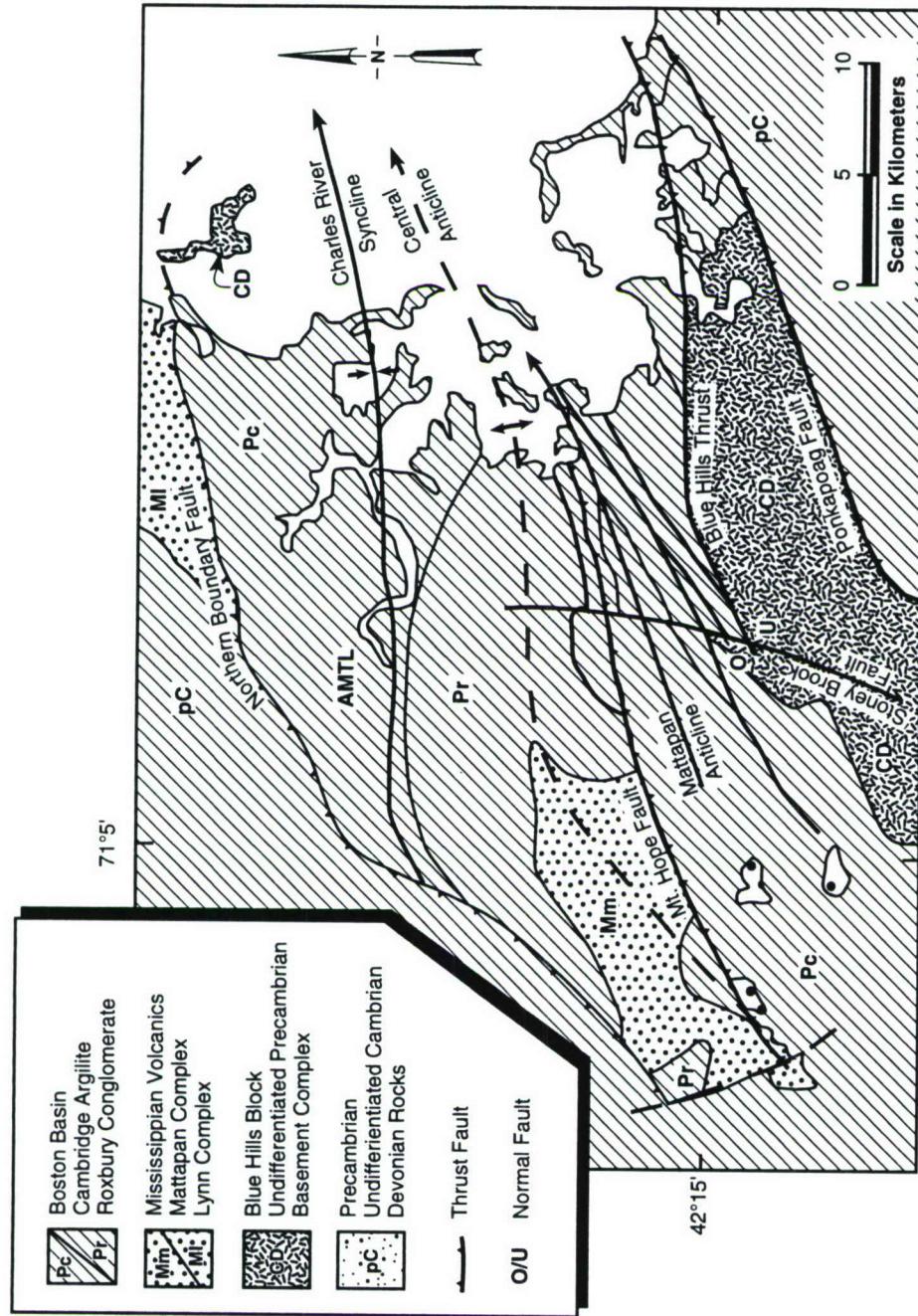
FIGURE 3-2 WIND ROSE (CALMS INCLUDED) FOR MTL
F-10

BOSTON LOGAN INTERNATIONAL AIRPORT
1985 THROUGH 1989
CALMS EXCLUDED



| | WIND SPEED (KNOTS) | | | | | | PERCENT OCCURRENCE |
|-----|--------------------|------|------|-------|-------|------|--------------------|
| | 1-3 | 3-6 | 6-10 | 10-16 | 16-21 | >21 | |
| N | 0.09 | 1.25 | 3.15 | 2.17 | 0.37 | 0.04 | |
| NNE | 0.05 | 0.66 | 0.96 | 0.80 | 0.17 | 0.02 | |
| NE | 0.05 | 0.58 | 1.05 | 1.30 | 0.52 | 0.18 | |
| ENE | 0.06 | 0.57 | 1.33 | 1.26 | 0.30 | 0.05 | |
| E | 0.08 | 0.85 | 2.44 | 2.15 | 0.31 | 0.11 | |
| ESE | 0.05 | 0.67 | 1.99 | 1.91 | 0.20 | 0.04 | |
| SE | 0.04 | 0.70 | 1.92 | 0.77 | 0.06 | 0.02 | |
| SSE | 0.03 | 0.65 | 1.08 | 0.30 | 0.02 | 0.01 | |
| S | 0.11 | 1.18 | 2.74 | 1.64 | 0.21 | 0.09 | |
| SSW | 0.04 | 0.74 | 2.15 | 2.57 | 0.49 | 0.10 | |
| SW | 0.04 | 0.79 | 3.41 | 4.00 | 0.73 | 0.12 | |
| WSW | 0.07 | 0.66 | 3.25 | 4.13 | 0.54 | 0.06 | |
| W | 0.05 | 0.68 | 3.07 | 5.01 | 1.04 | 0.18 | |
| NW | 0.04 | 0.60 | 3.77 | 5.77 | 1.43 | 0.31 | |
| NW | 0.04 | 0.56 | 2.87 | 4.17 | 1.13 | 0.21 | |
| NNW | 0.03 | 0.48 | 2.19 | 2.46 | 0.56 | 0.08 | |

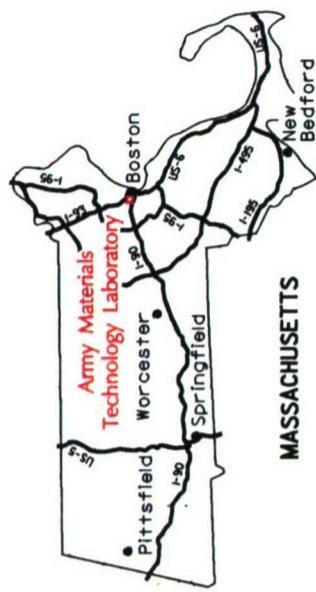
FIGURE 3-3 WIND ROSE (CALMS EXCLUDED) FOR MTL



SOURCE: EG&G, June 1990

936-7853b

FIGURE 3-4 GENERAL BEDROCK GEOLOGY MAP OF THE BOSTON BASIN (BILLINGS, 1976)



Estimated Bedrock Depth
in Feet BGS Based on Phase
1 Seismic Refraction Survey
and Phase 2 Soil Boring Program

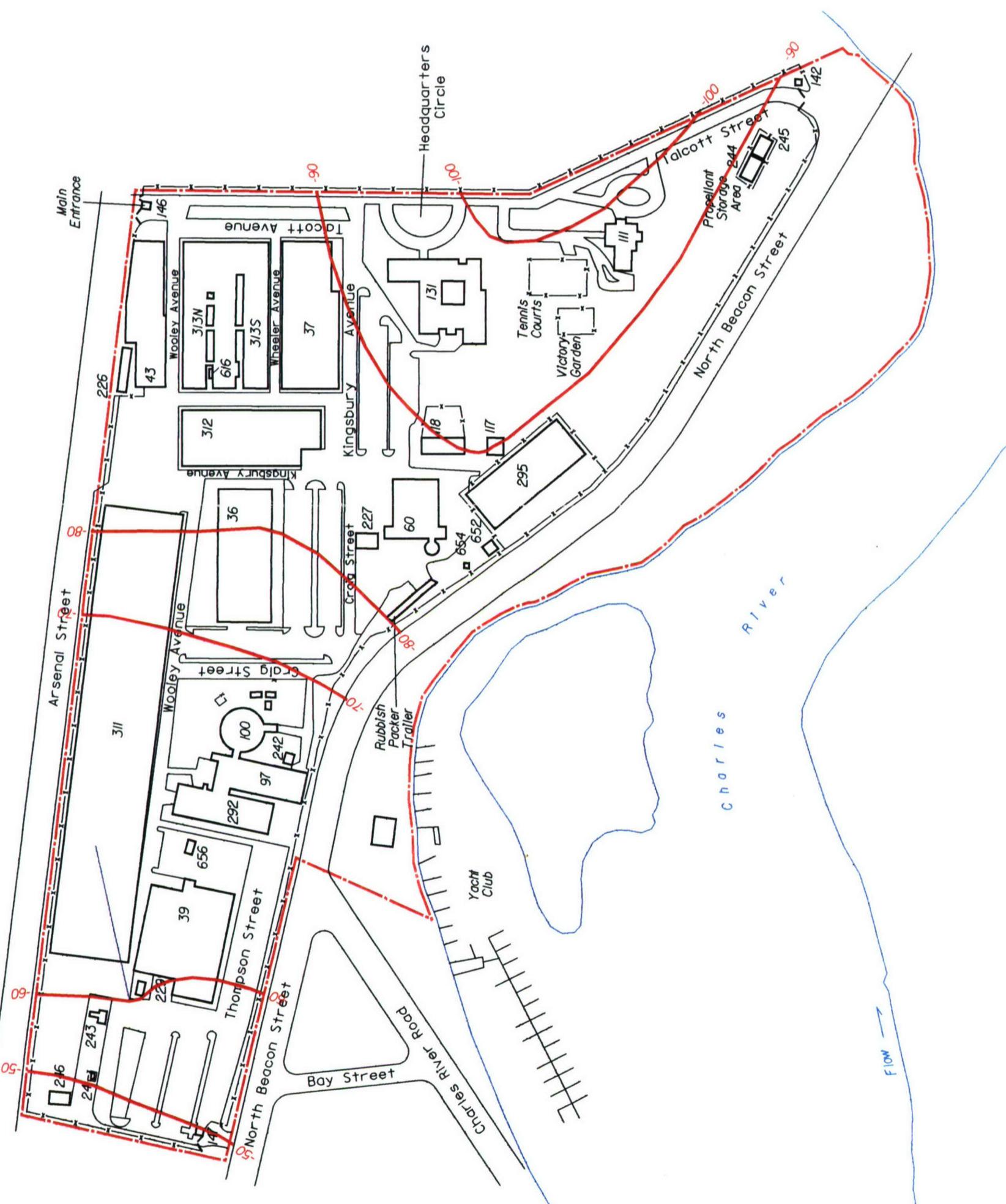
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Technology Laboratory
Watertown, MA

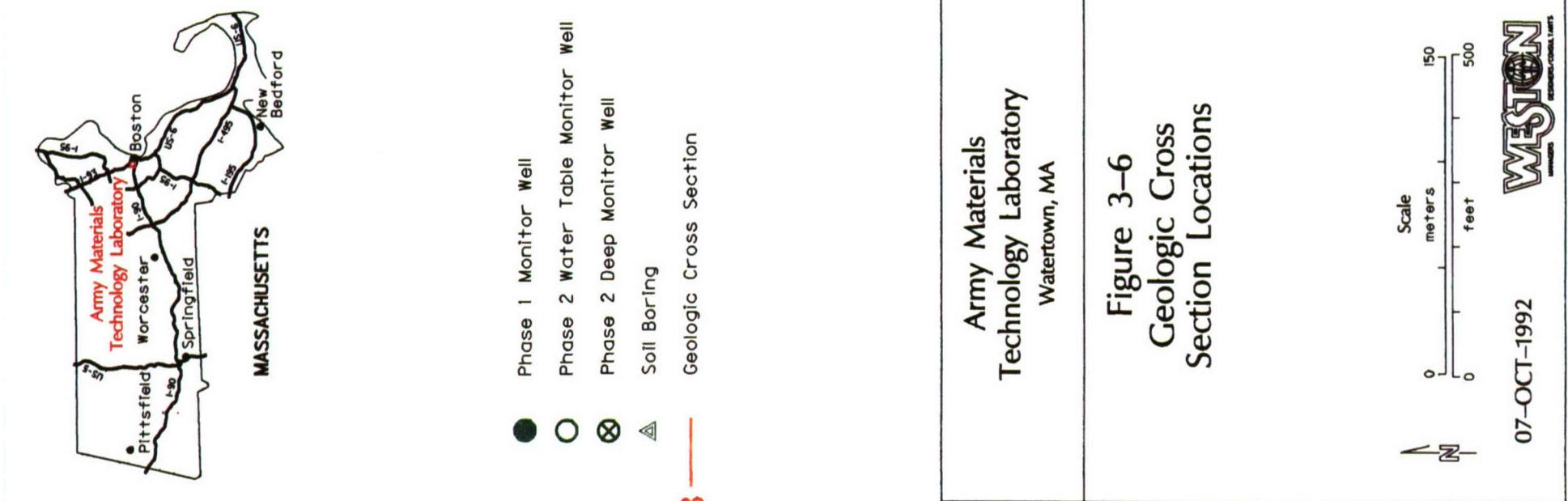
Figure 3-5
Approximate Depth
to Bedrock Surface

Scale
meters
feet
0 500

07-OCT-1992

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Environmental, Construction, Survey

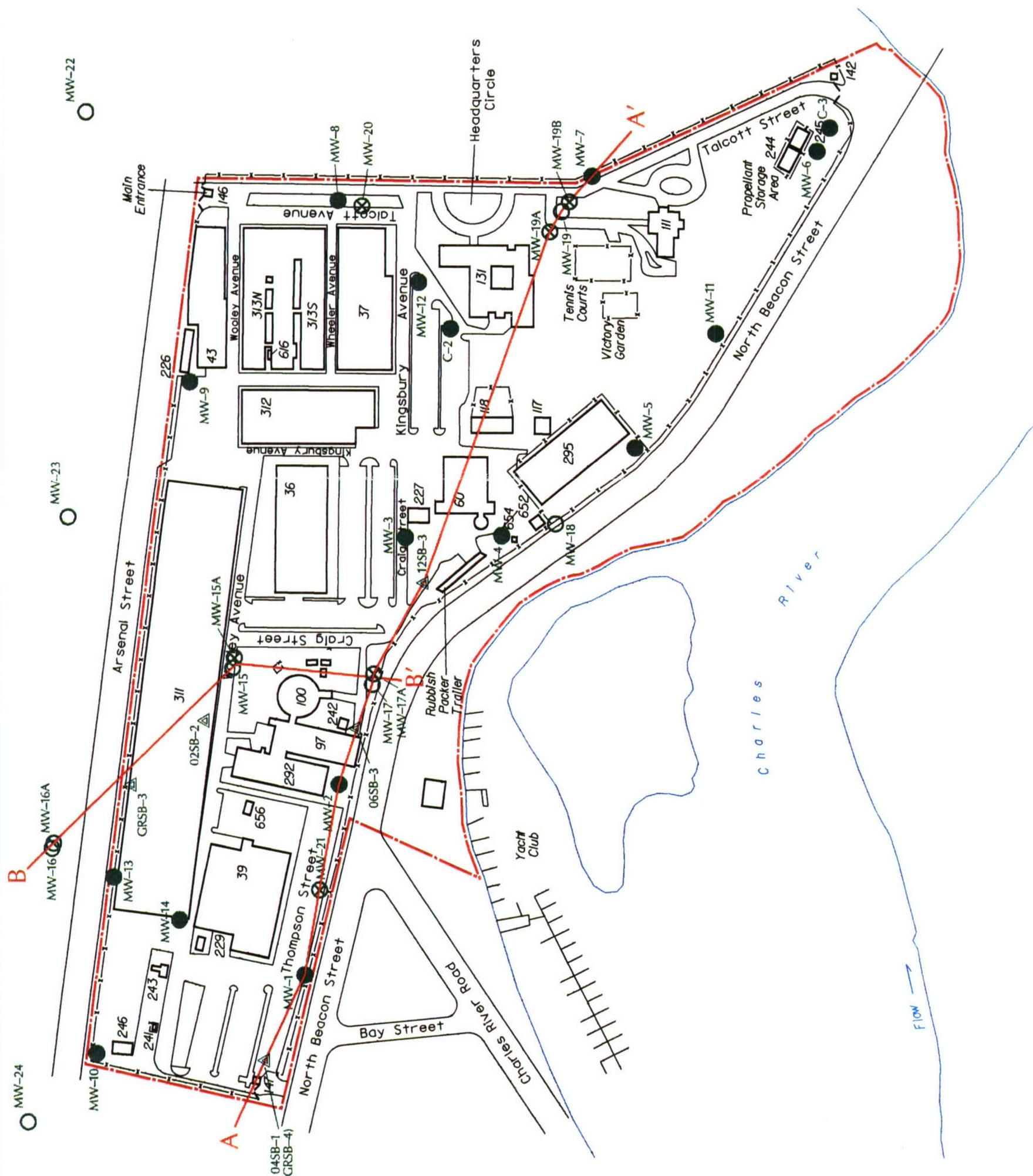




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Technology Laboratory
Watertown, MA

Figure 3-6
Geologic Cross
Section Locations

Scale
meters
feet
0 500
07-OCT-1992



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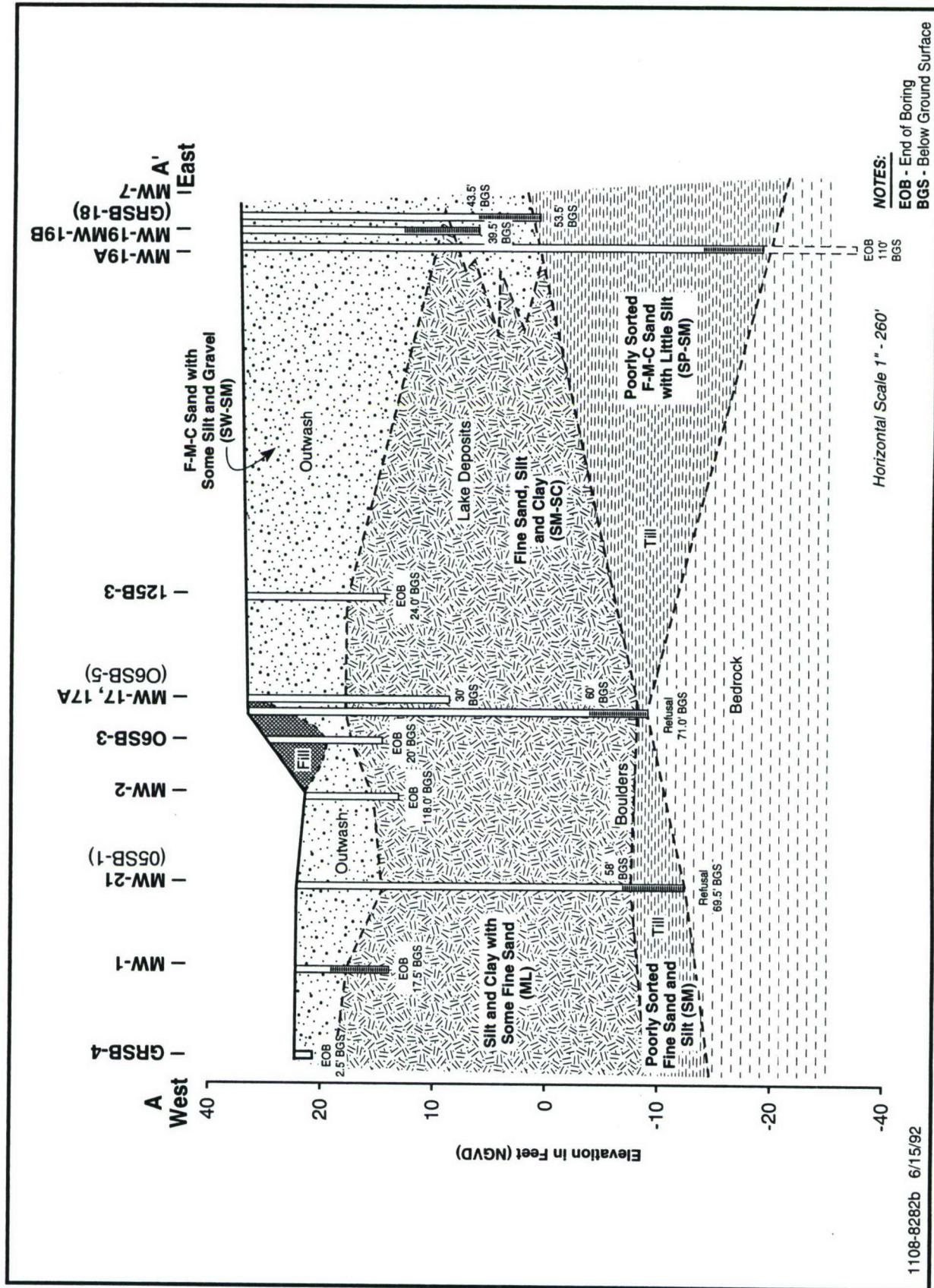


FIGURE 3-7 GEOLOGICAL CROSS SECTION A-A'

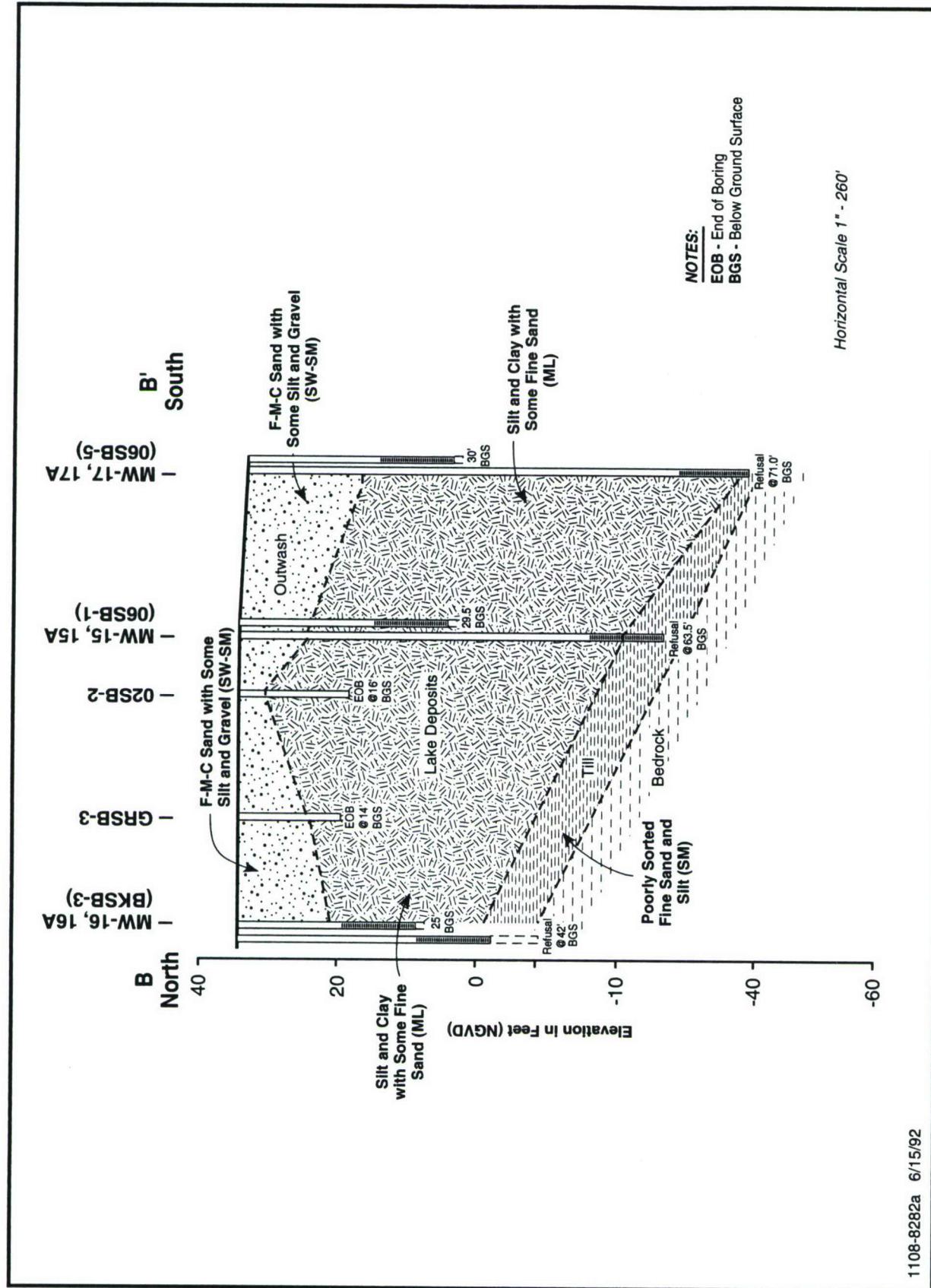
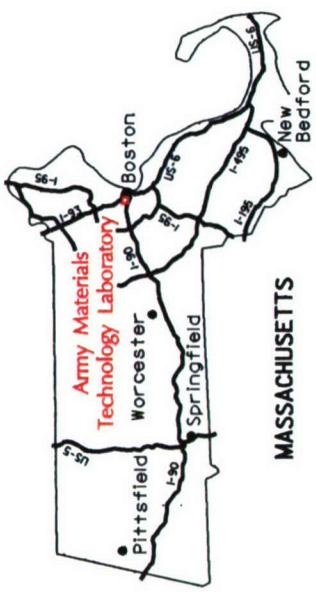


FIGURE 3-8 GEOLOGICAL CROSS SECTION B-B'



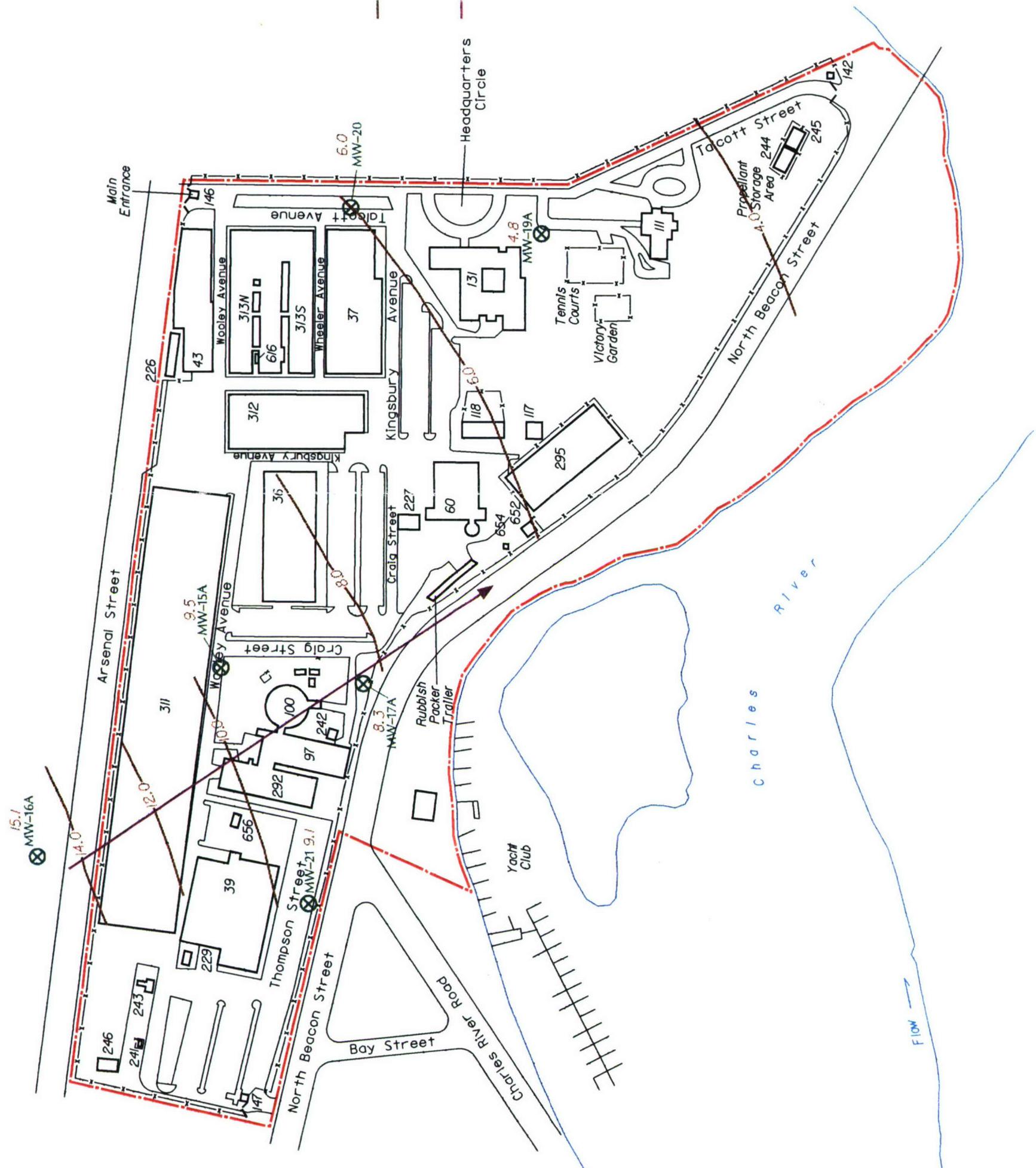
Phase 2 Deep Monitor Well
Groundwater elevation in feet,
based on 09-Dec-1991 water level
measurements. All elevations
referenced to National Geodetic
Vertical Datum of 1929.

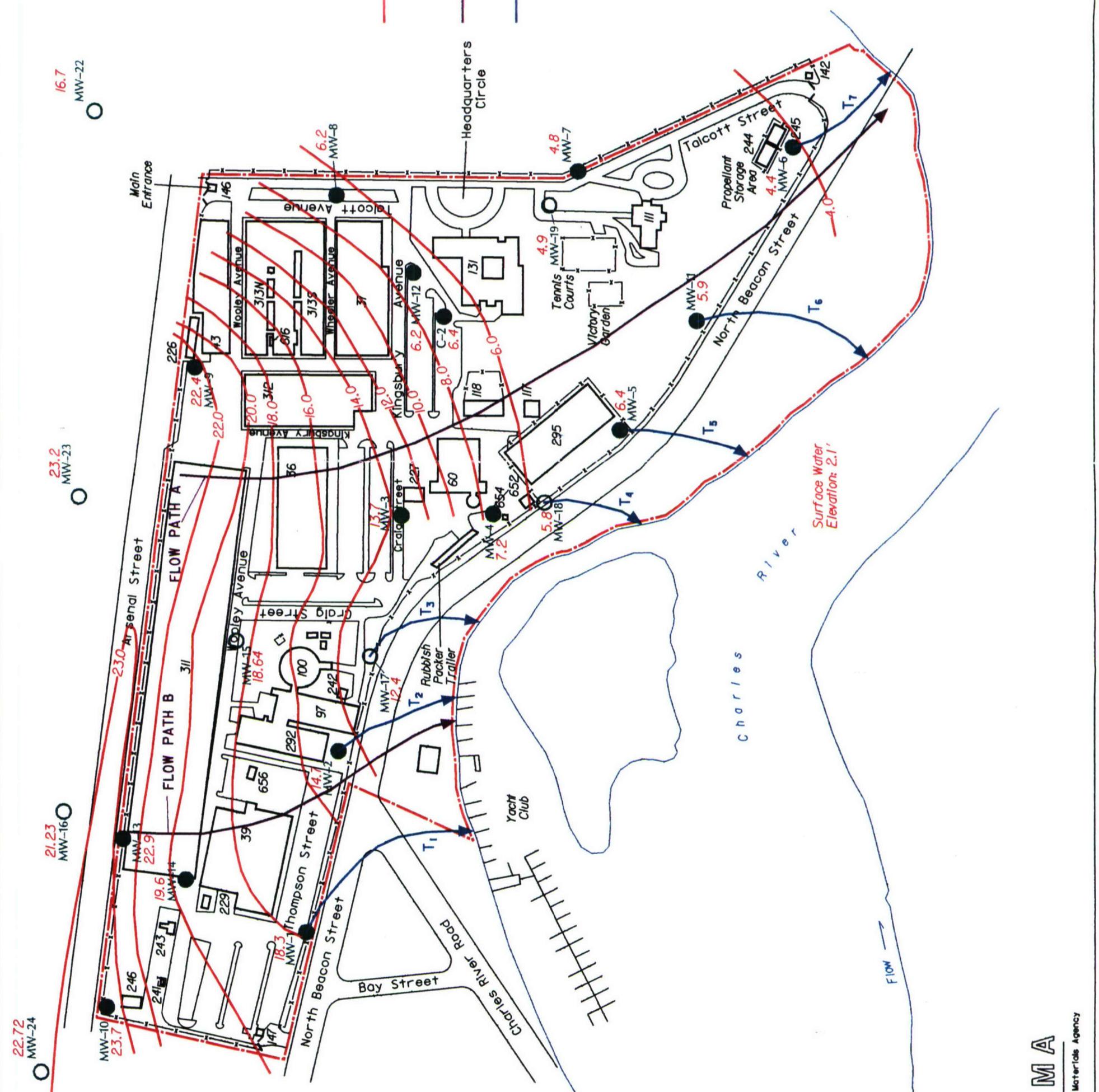
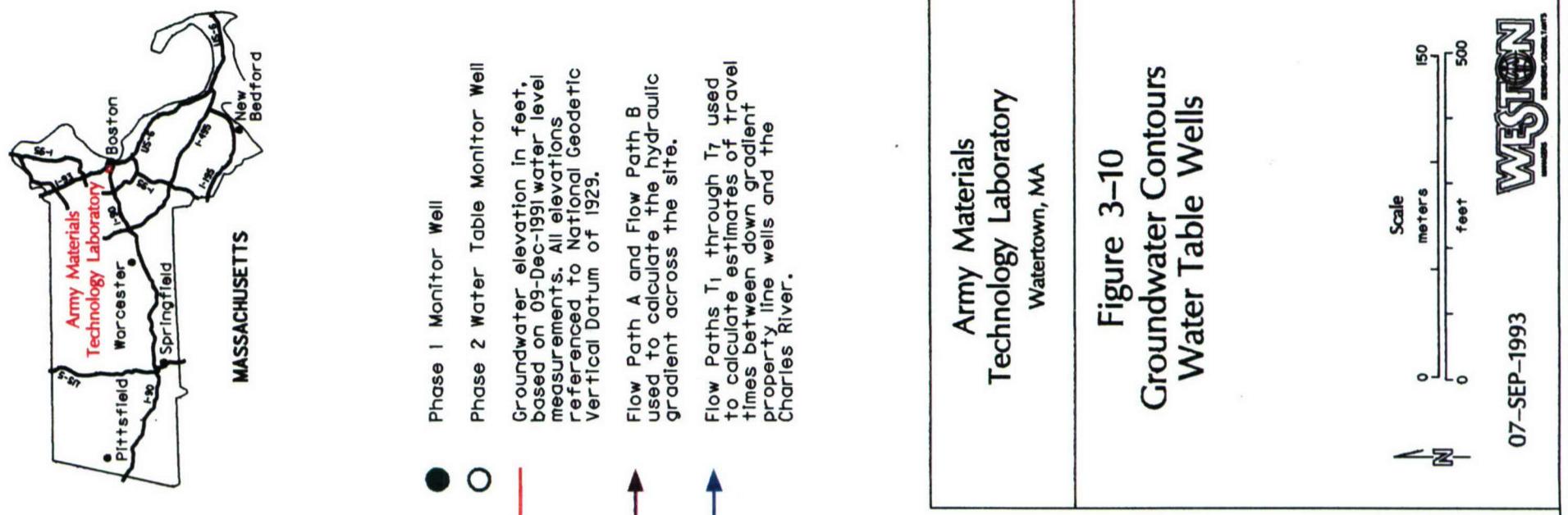
Flow Path

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Watertown, MA

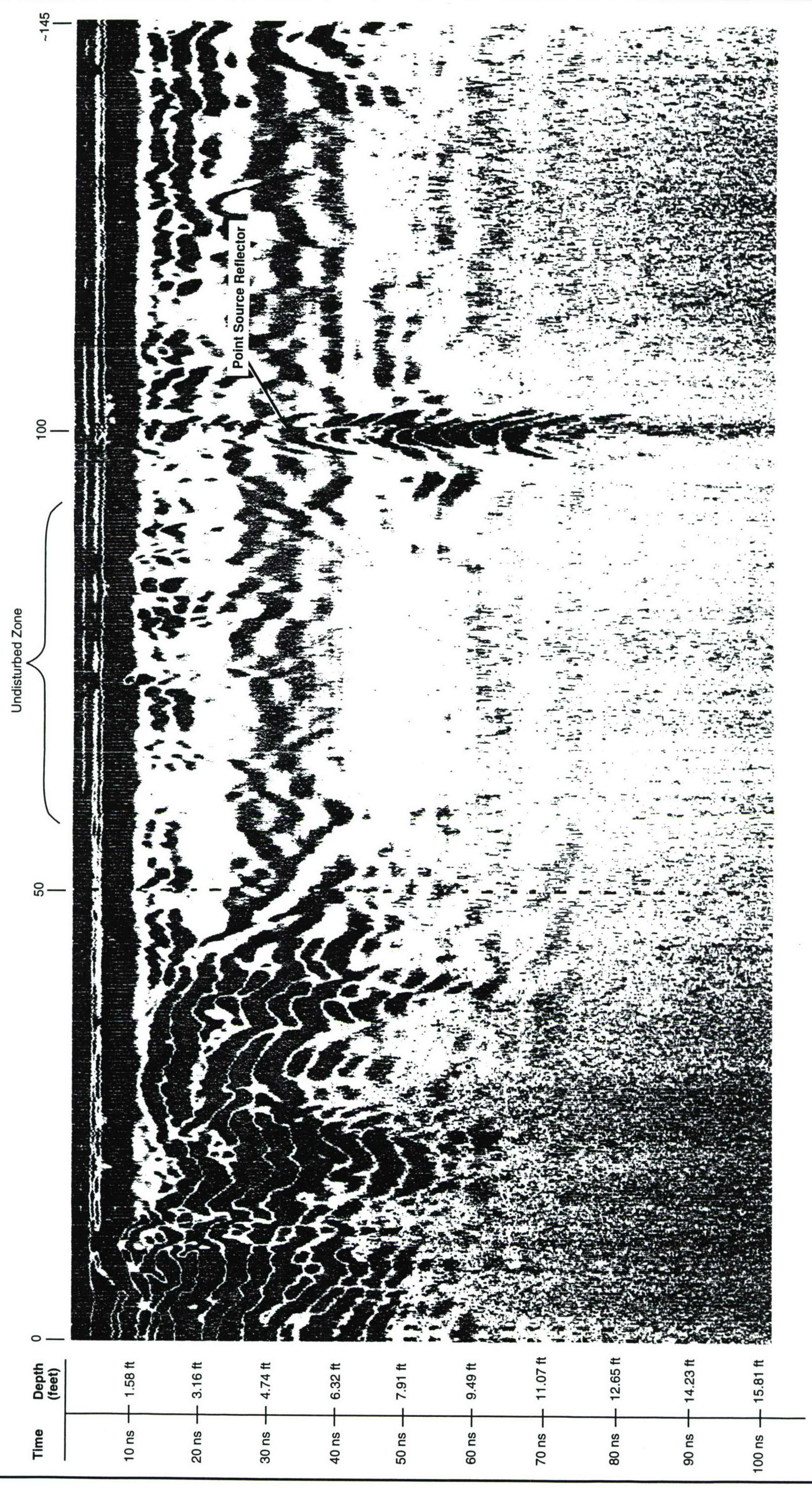
Figure 3-9
Groundwater Contours
Deep Wells

Scale
meters
feet
0 150 500
0 500
N
07-OCT-1992
WESTON
Environmental Consultants



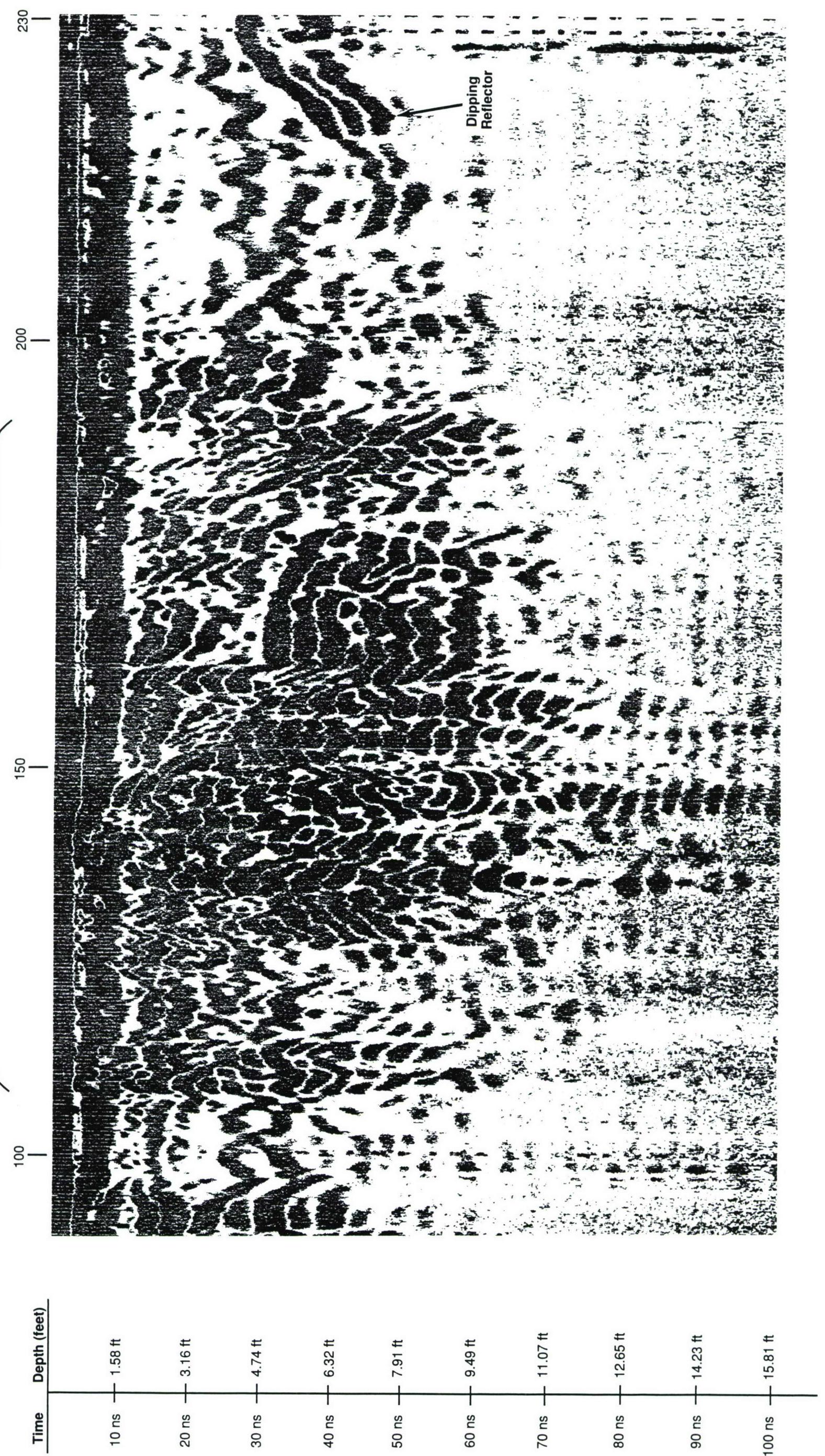


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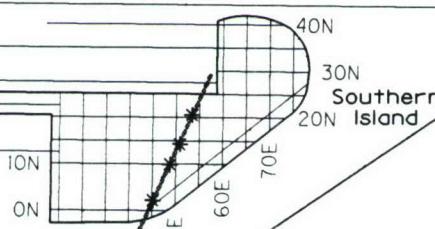
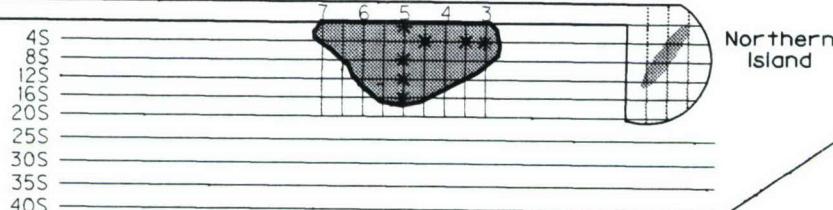
925-7814

FIGURE 4-1 EXAMPLES OF GPR SIGNATURES
PARK TRAVERSE 270 WEST



Building 37

Kingsbury Avenue



Building 131

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Technology Laboratory
Watertown, MA

Figure 4-3
Geophysical Interpretation
Parking Lot Between
Buildings 37 and 131



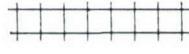
Discrete Buried Object



High Conductivity Readings



Disturbed or Fill Area



GPR Traverse



Buried Utilities

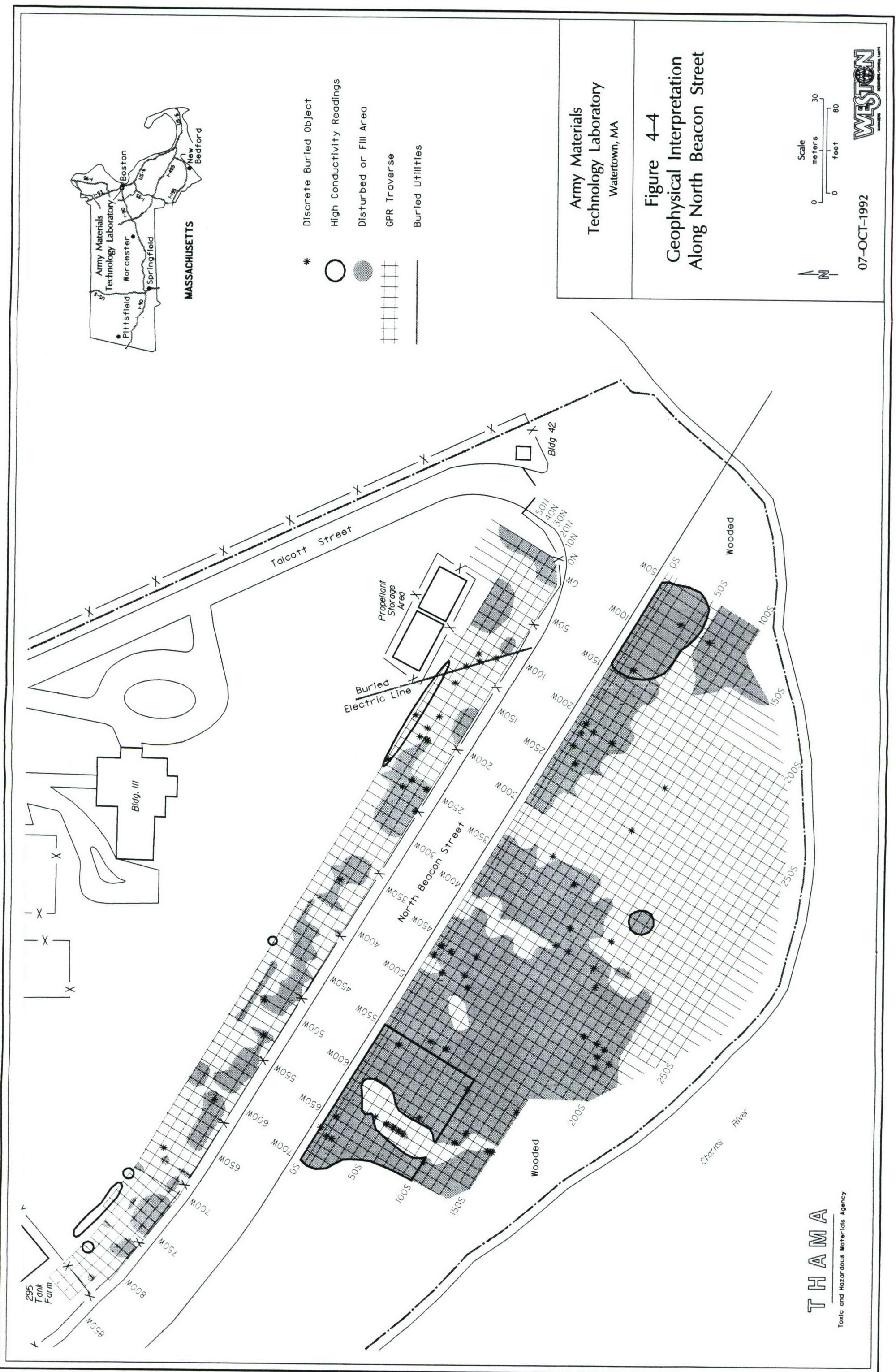
F-21

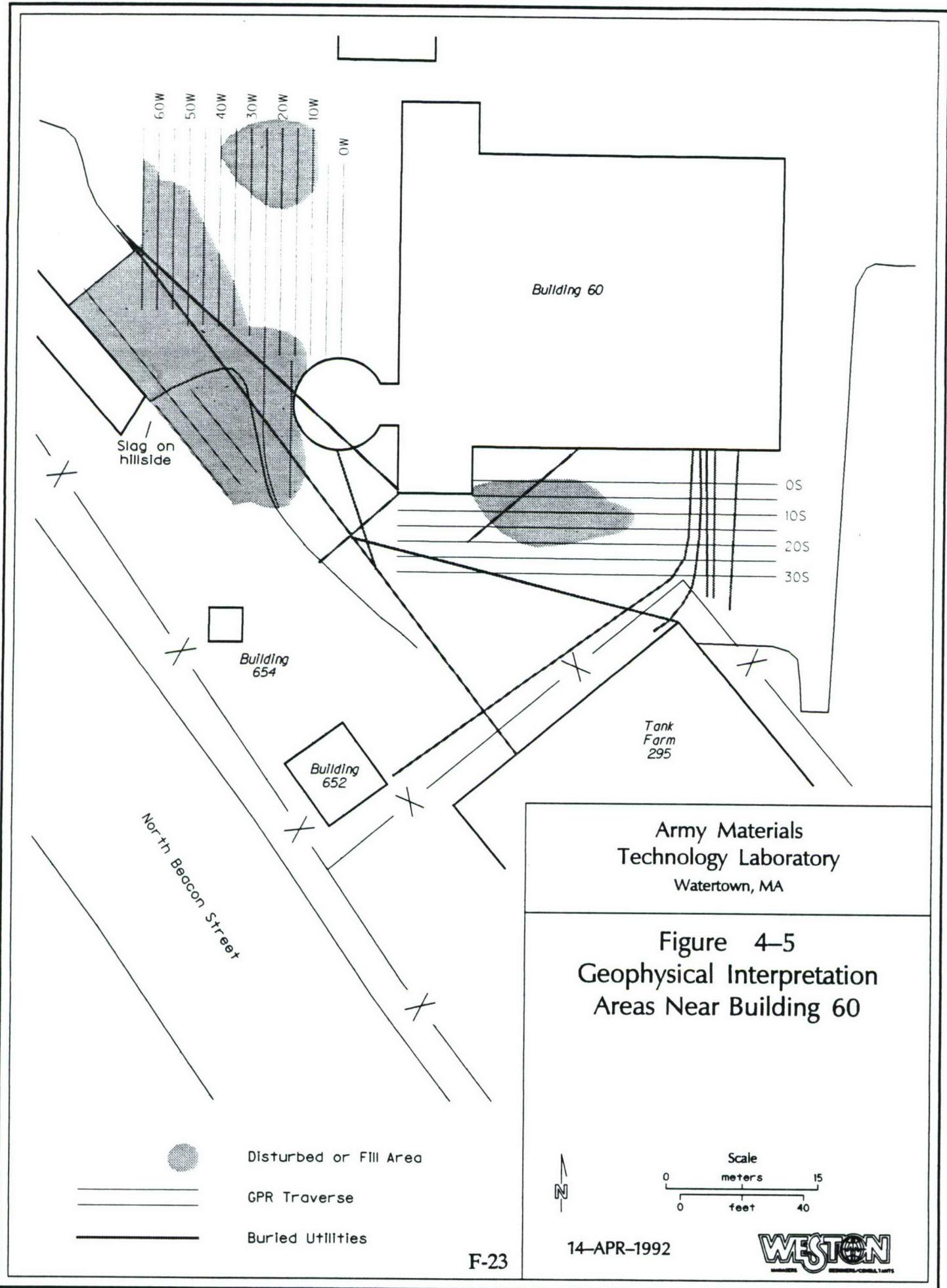


Scale
meters
0 15
0 40
feet

26-MAY-1992

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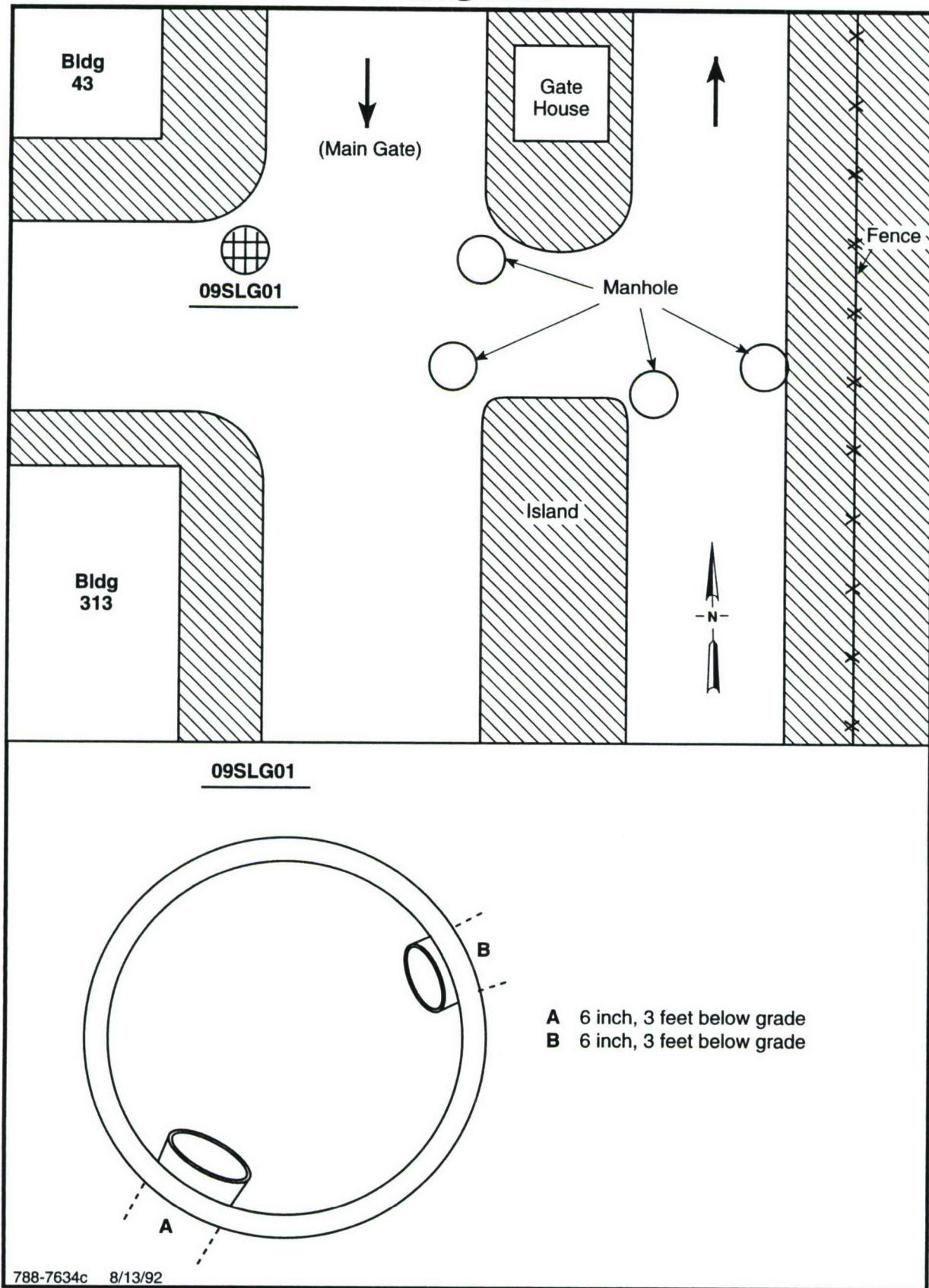


FIGURE 4-6A GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS AT VARIOUS SEWER JUNCTIONS: 09SLG01

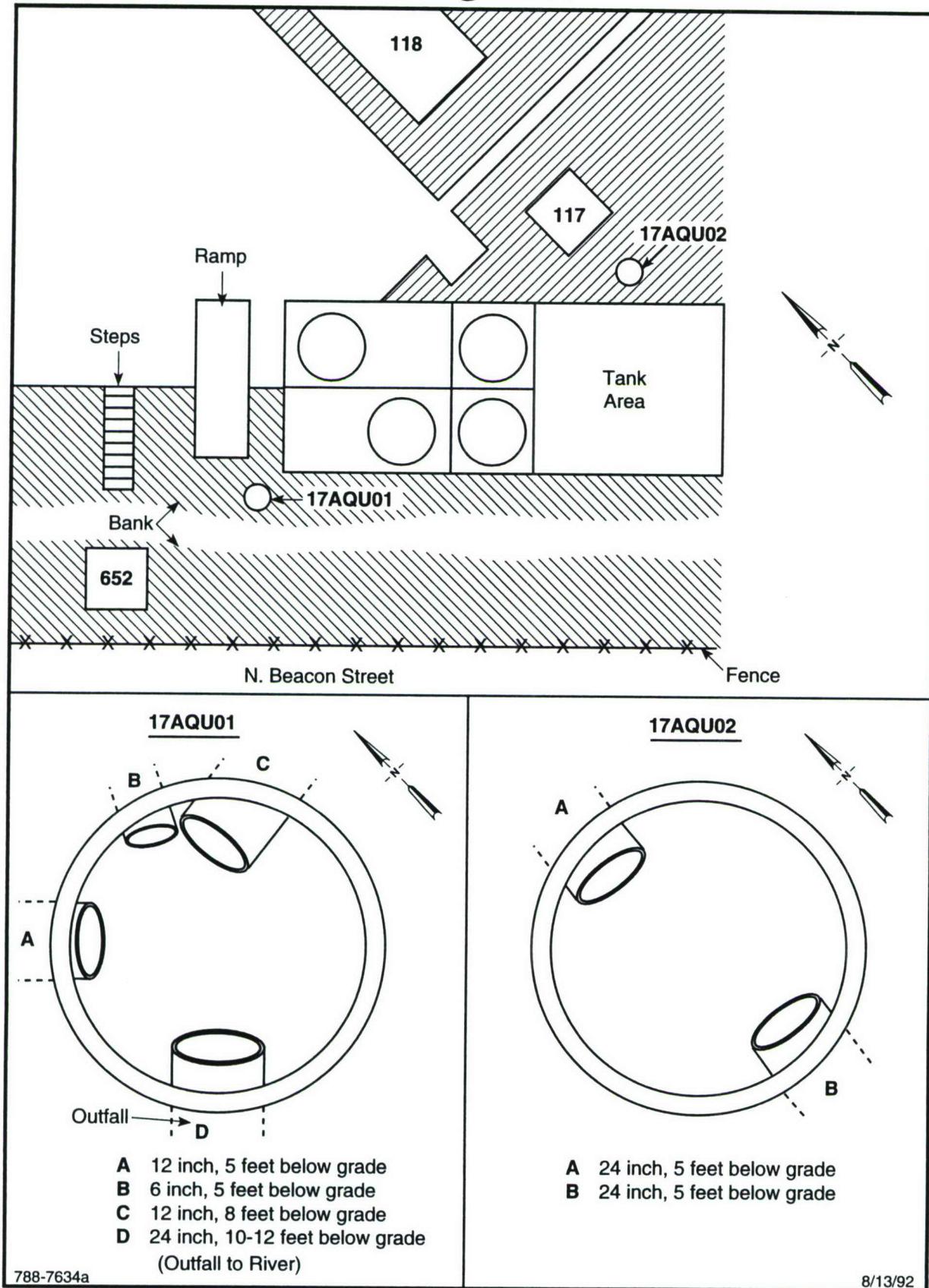


FIGURE 4-6B GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS AT VARIOUS SEWER JUNCTIONS: 17AQU01 AND 17AQU02

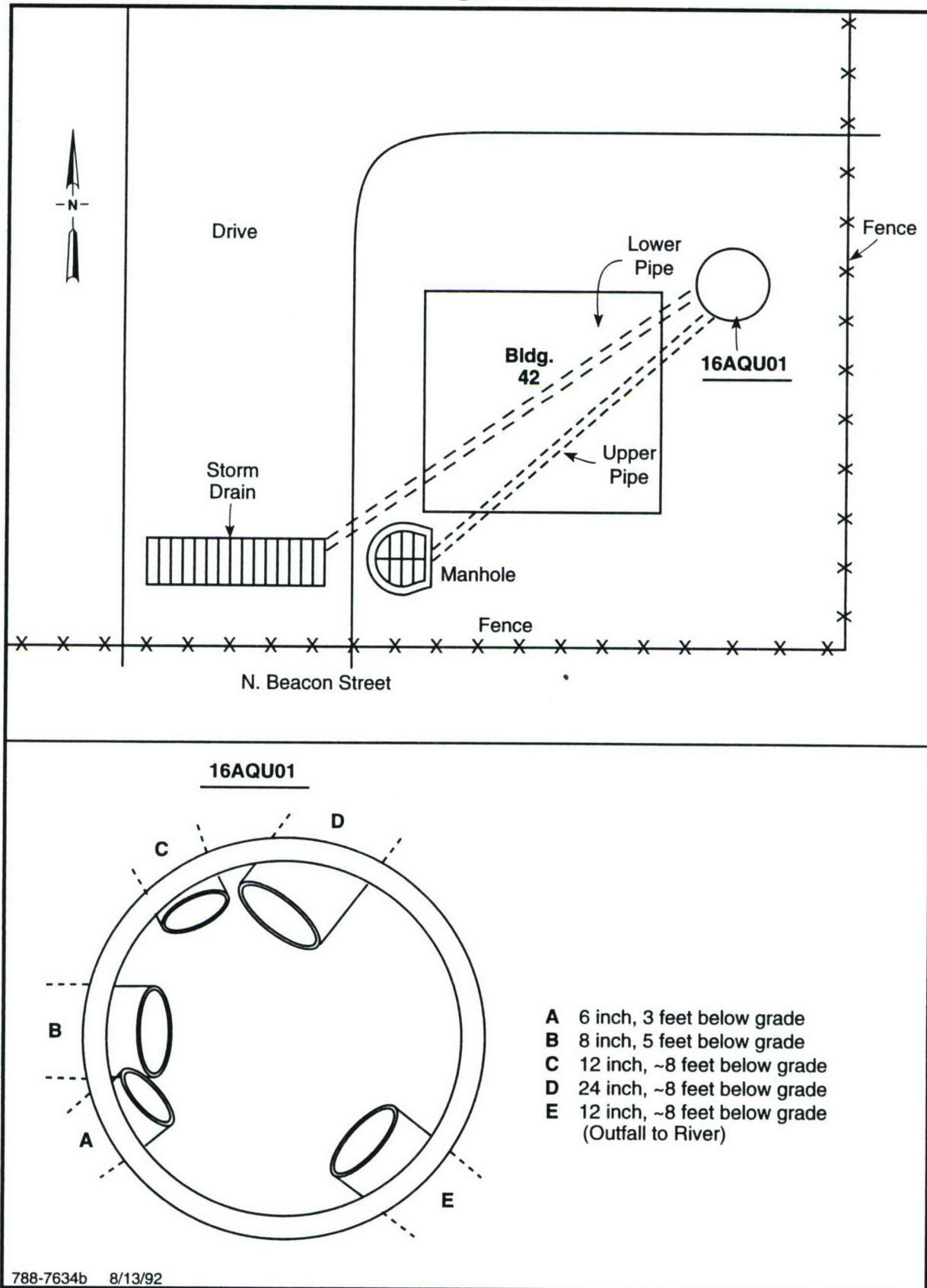
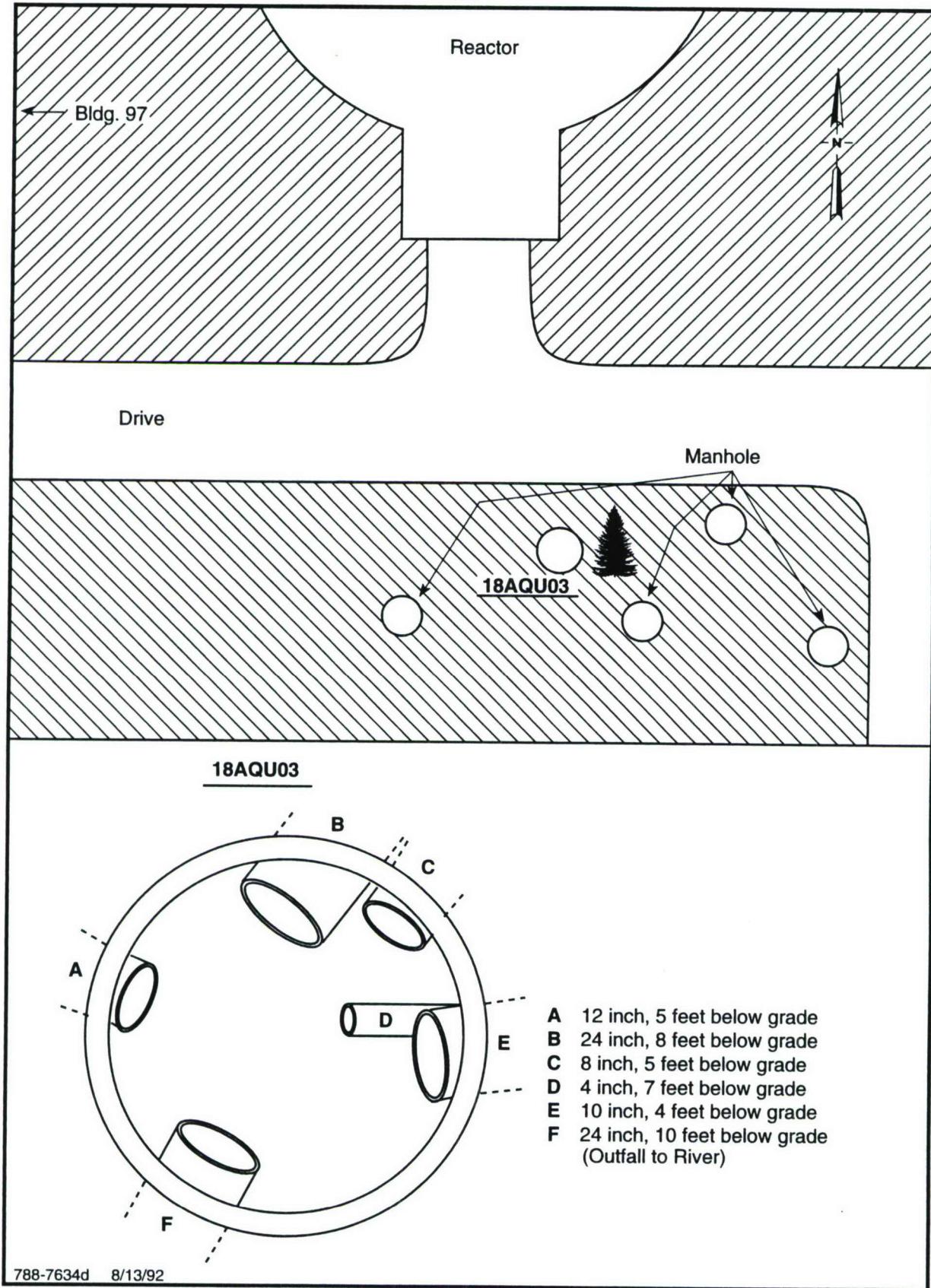
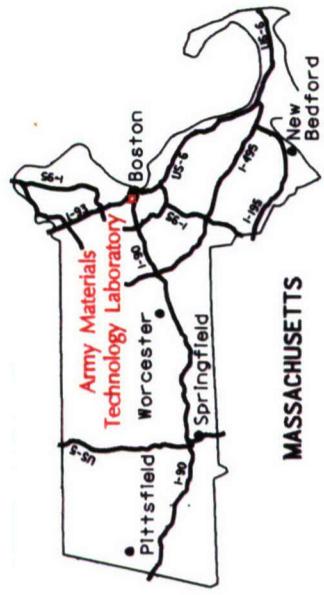


FIGURE 4-6C GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS AT VARIOUS SEWER JUNCTIONS: 16AQU01



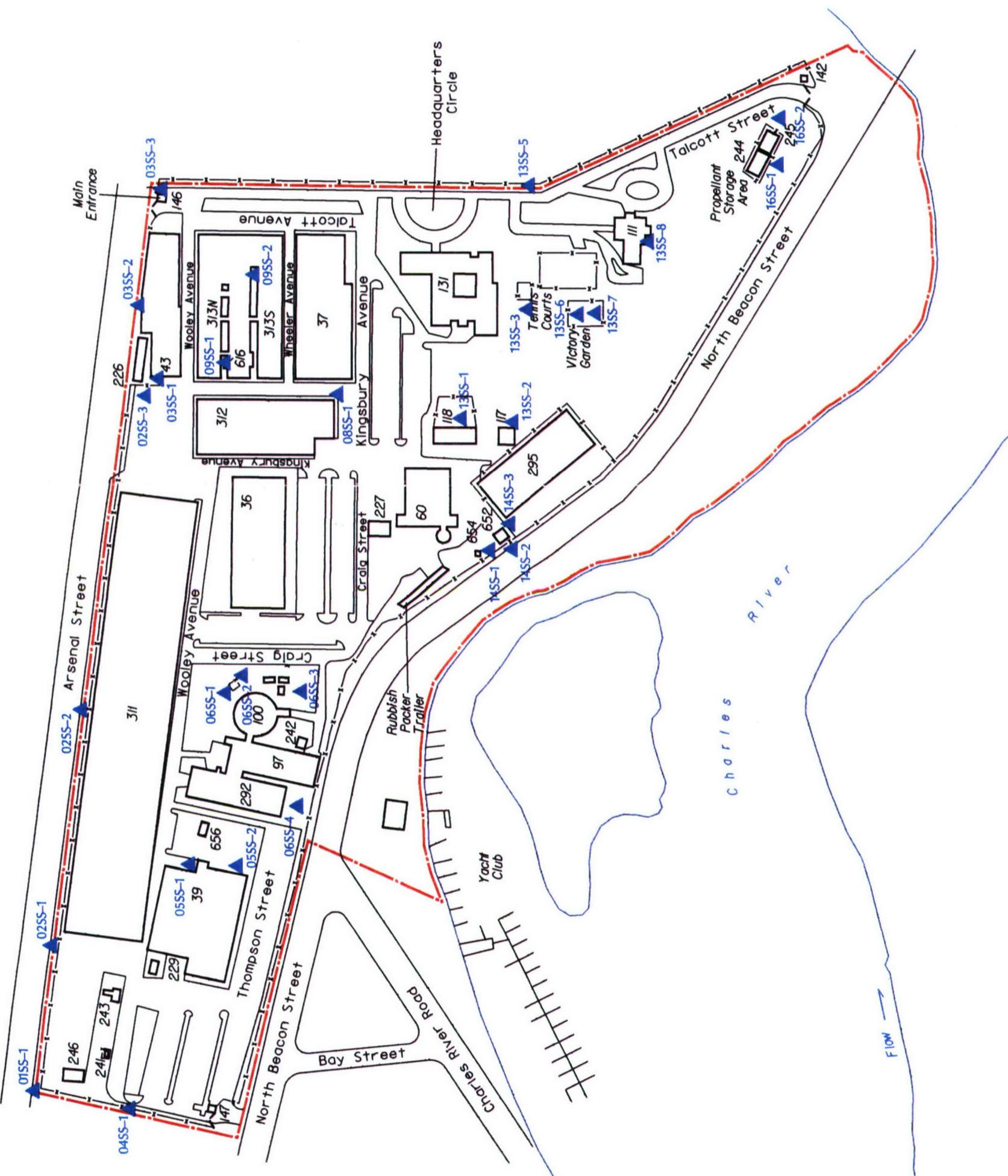
**FIGURE 4-6D GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS
AT VARIOUS SEWER JUNCTIONS: 18AQU03**

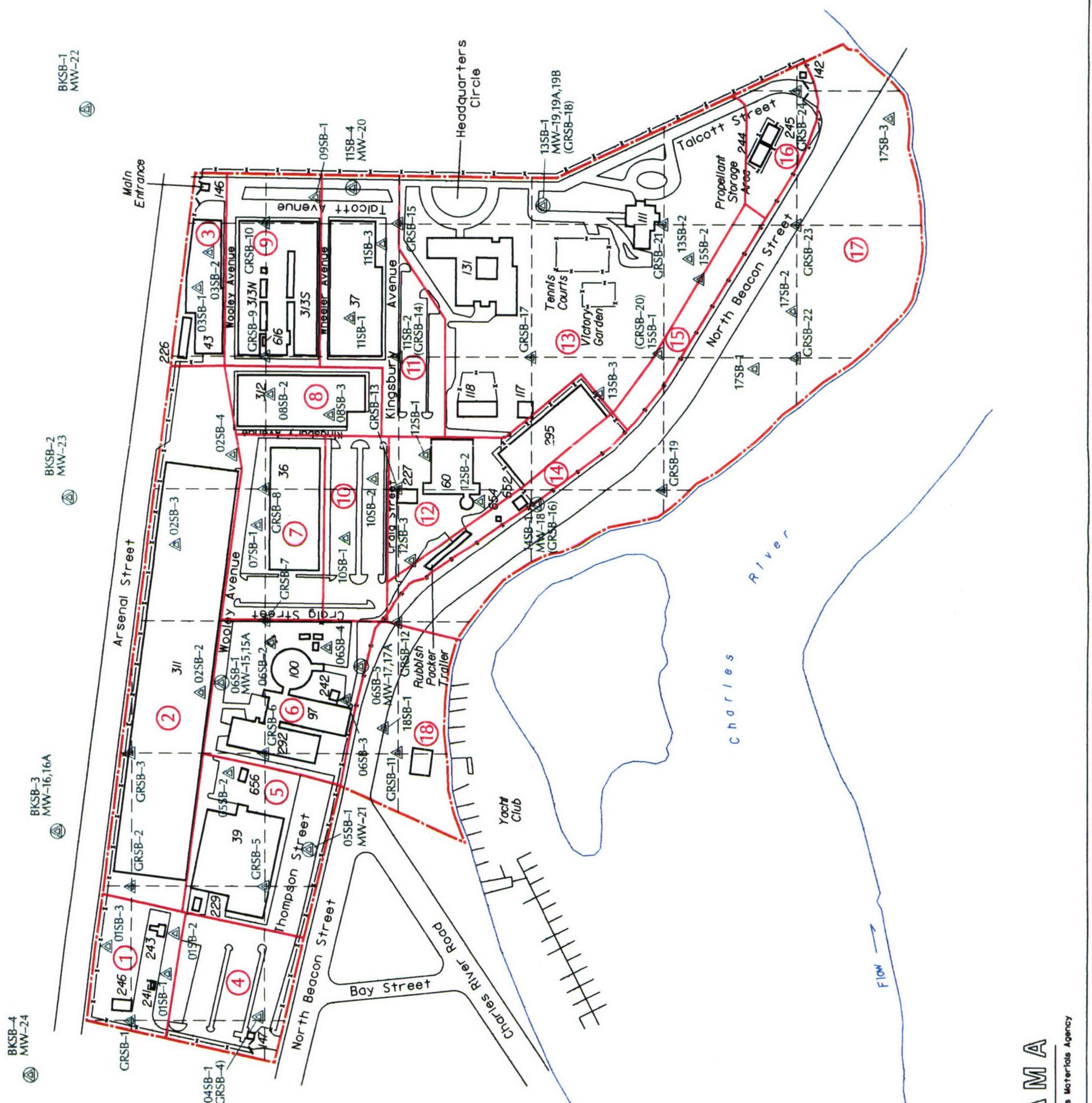
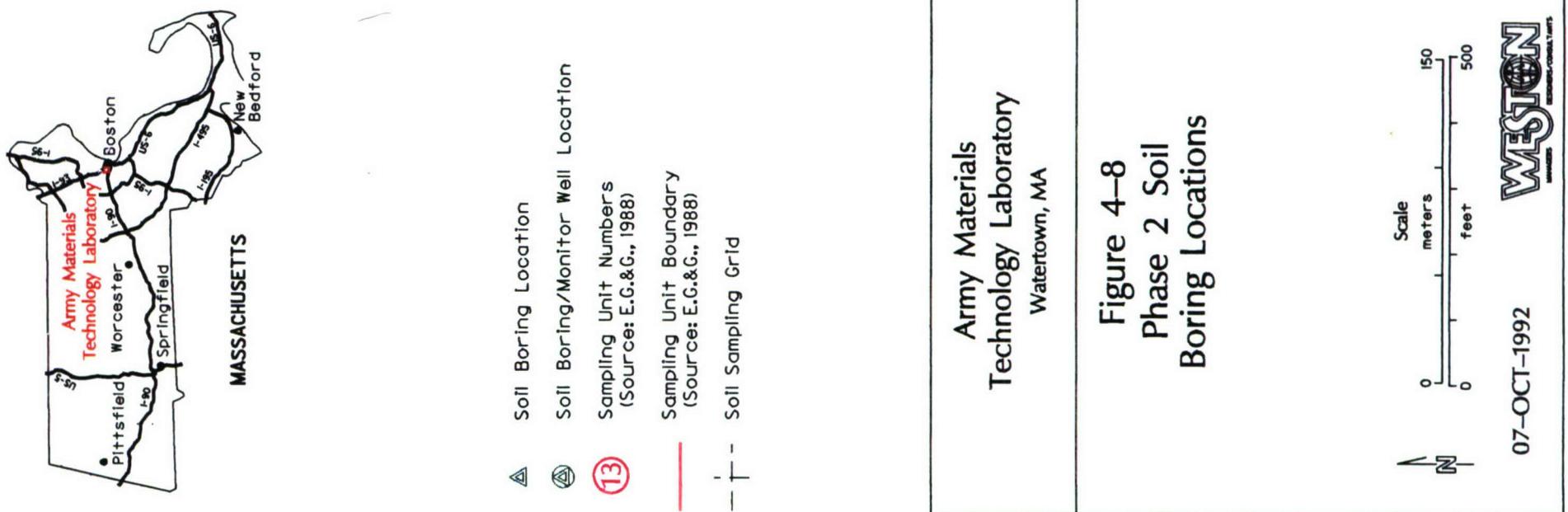


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Figure 4-7
Phase 2 Surface
Soil Sampling Locations

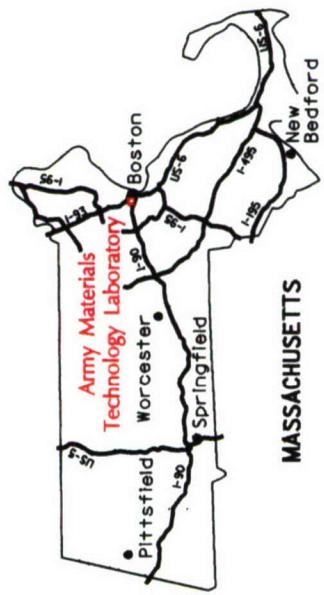
Scale
meters
feet
0 150 500
08-OCT-1992
WESTON





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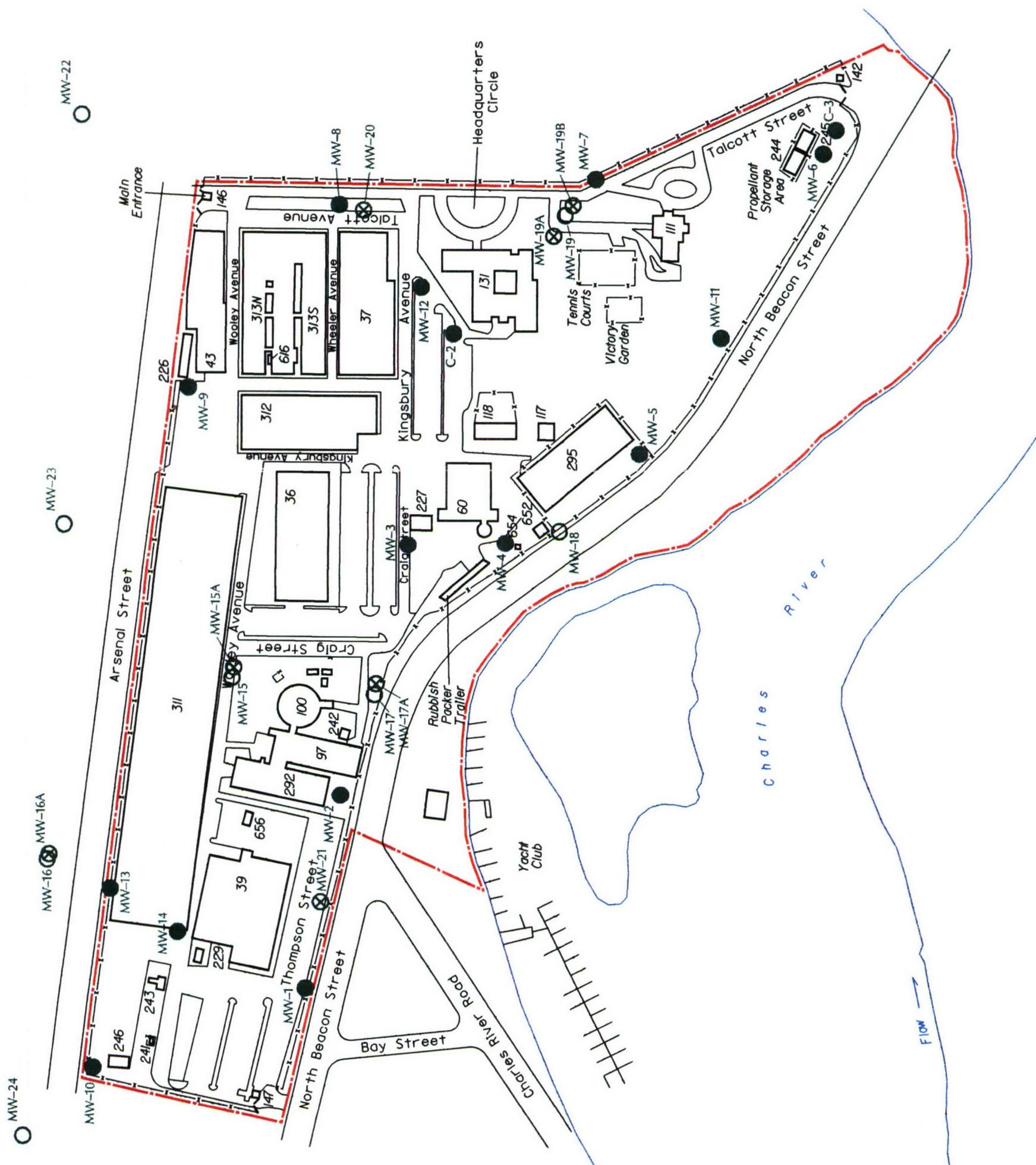
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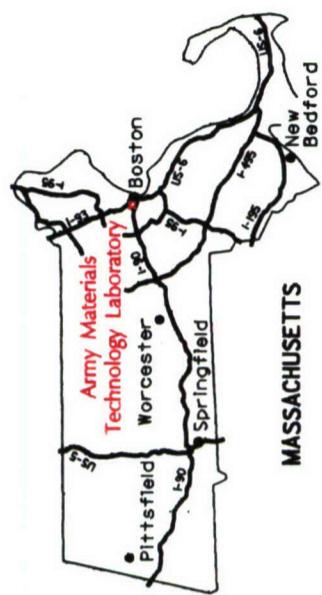
Figure 4-9
Phase 2 Monitor
Well Sampling Locations

Pre-Existing Monitor Well
Phase 2 Monitor Well
Phase 2 Deep Monitor Well

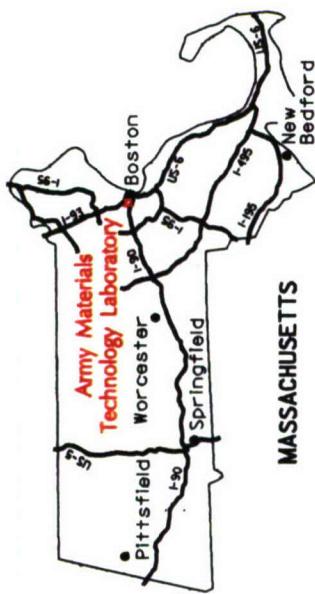
Scale
meters feet
0 0 500

U.S. AMM A _____ Toxic and Hazardous Materials Agency





Sediment and Surface Water Sampling Location (with Identification)
 Shallow and Deep Sediment Sampling Location (and Surface Water Sampling Location if Identified as such)
 Sediment/Liquid Sample to be Taken from Storm Sewer Outfall Pipe (with Identification)
 SW-10P
 SW-SD-14 ●
 SW-SD-8 □
 SD-14P
 SD-10P
 SD-14
 SD-15
 SD-16
 SD-17
 SD-18
 SD-19
 SD-20
 SD-21
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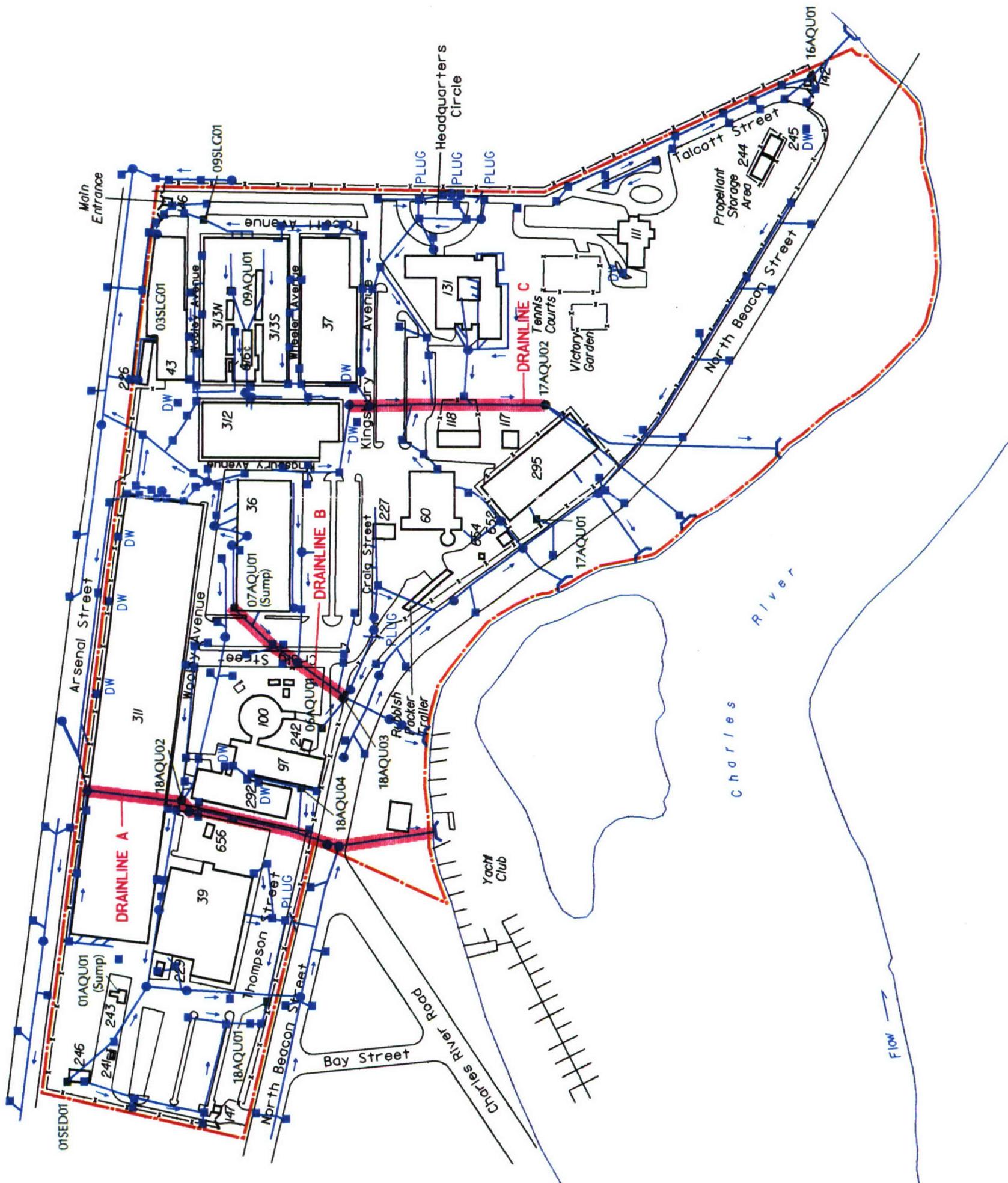
Charles River Outfall
Formerly Sampled Location
16AQU01 ● Storm Drain Main
● Storm Drain Main
● Drain Manhole
● Catch Basin
DW □ Dry Well
Direction of Flow
Cistern
Line Plugged
Storm Sewer Line to be
Inspected by T.V.

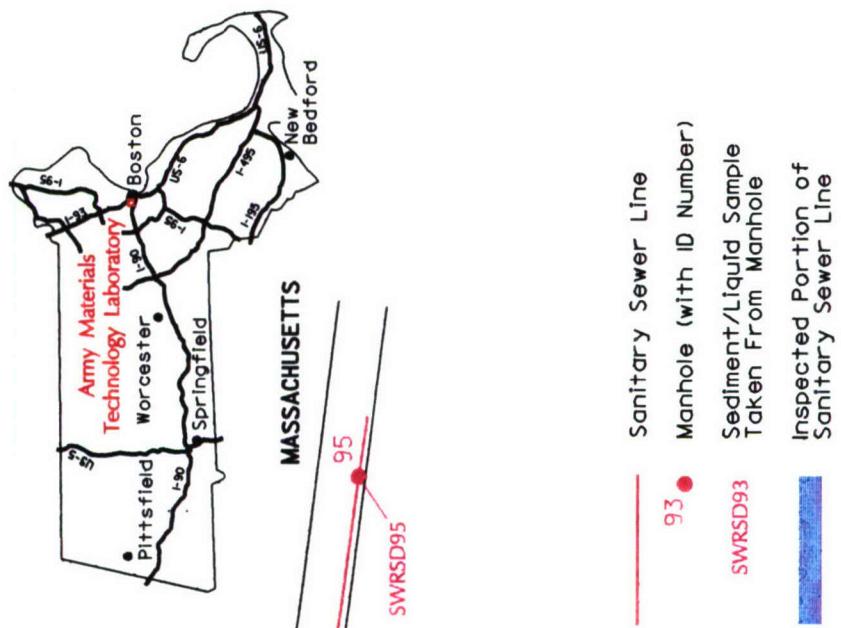
Army Materials
Technology Laboratory
Watertown, MA

Figure 4-11
Areas of Storm
Sewer Inspection

Scale
meters
feet
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0 150 500
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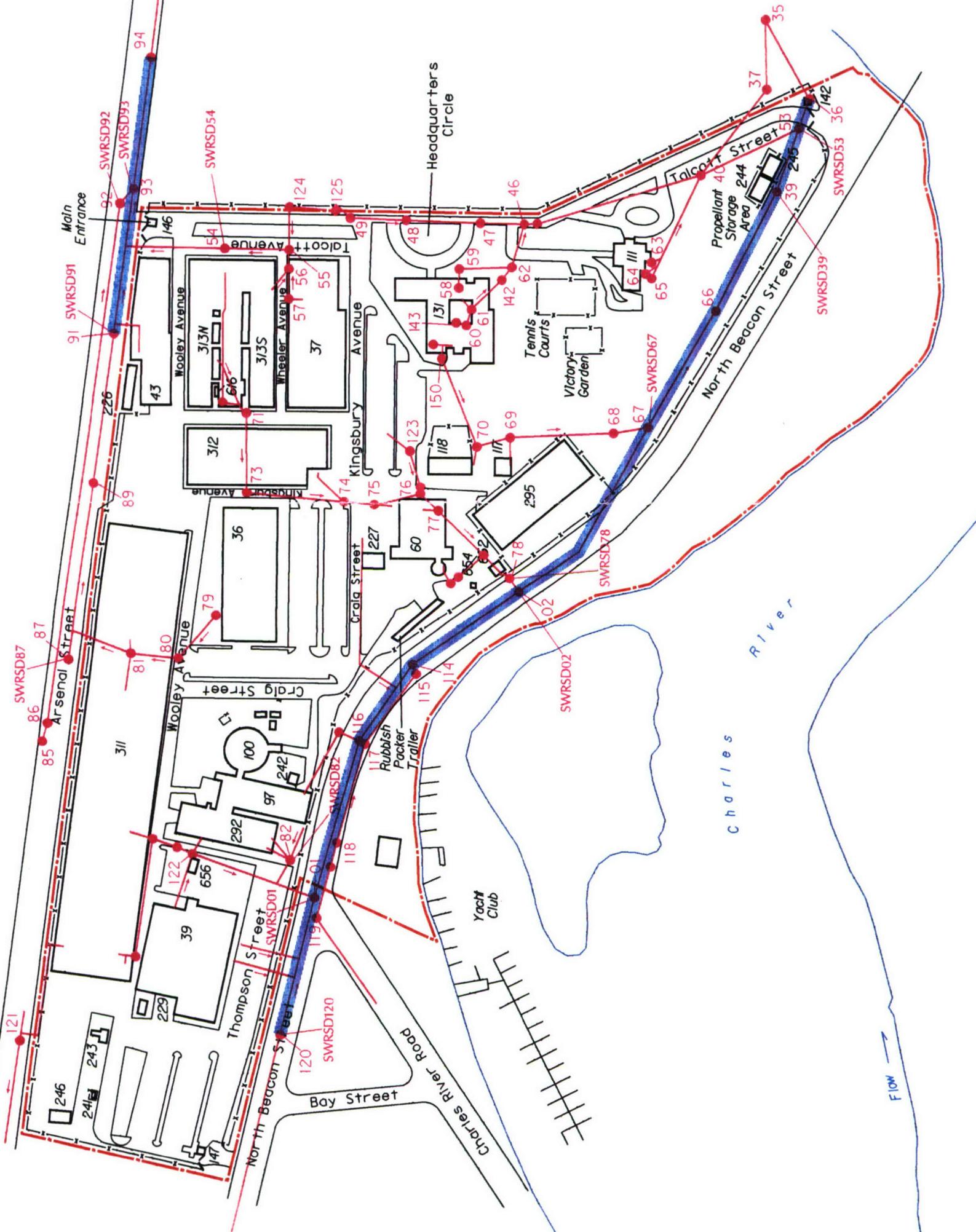
Figure 4-12
Phase 2 Sanitary Sewer Inspection and Sampling Locations

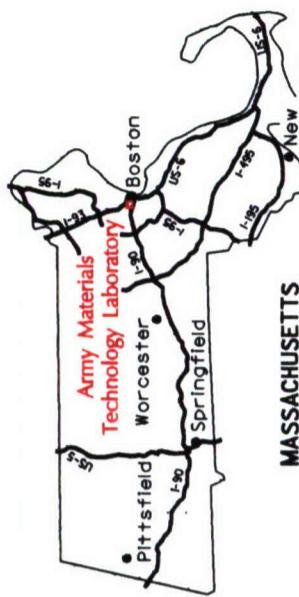
Scale
meters
feet

0 500 150

07-OCT-1992

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Environmental Consulting Engineers





Army Materials Technology Laboratory

Watertown, MA

Figure 4-13
Elevated Outdoor
Gamma Readings

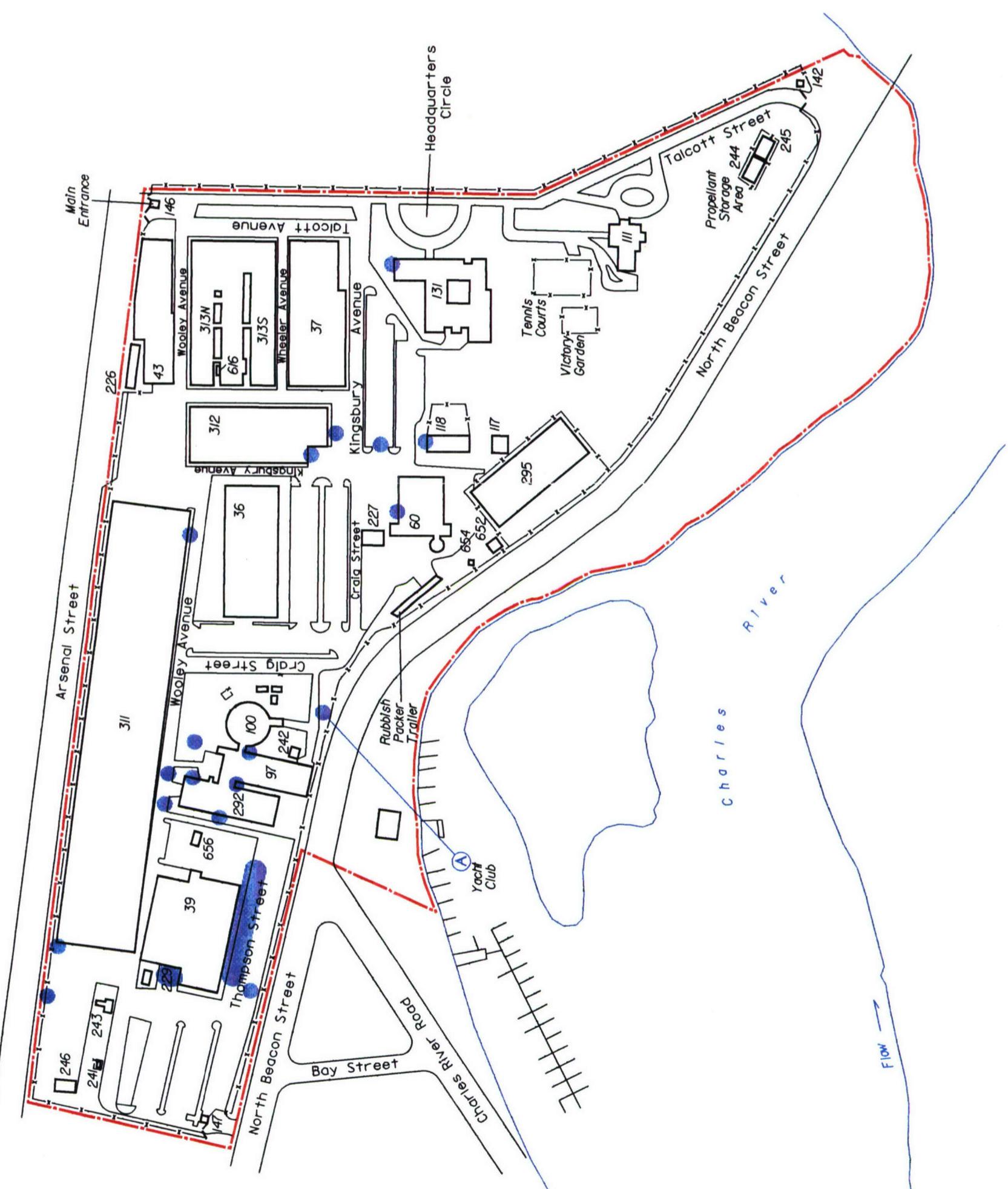
Location of Fidler Readings
of 9000 cpm or above

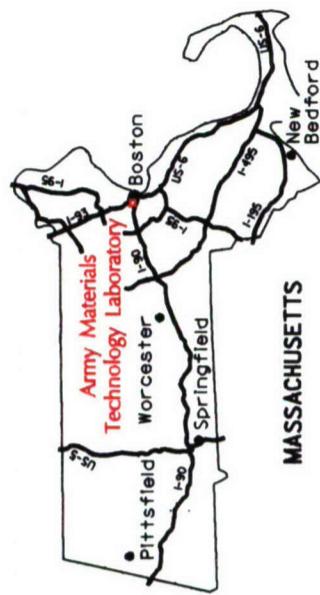
Potential Contamination

Scale
meters feet

07-OCT-1992

Toxic and Hazardous Materials Agency





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Technology Laboratory**
Watertown, MA

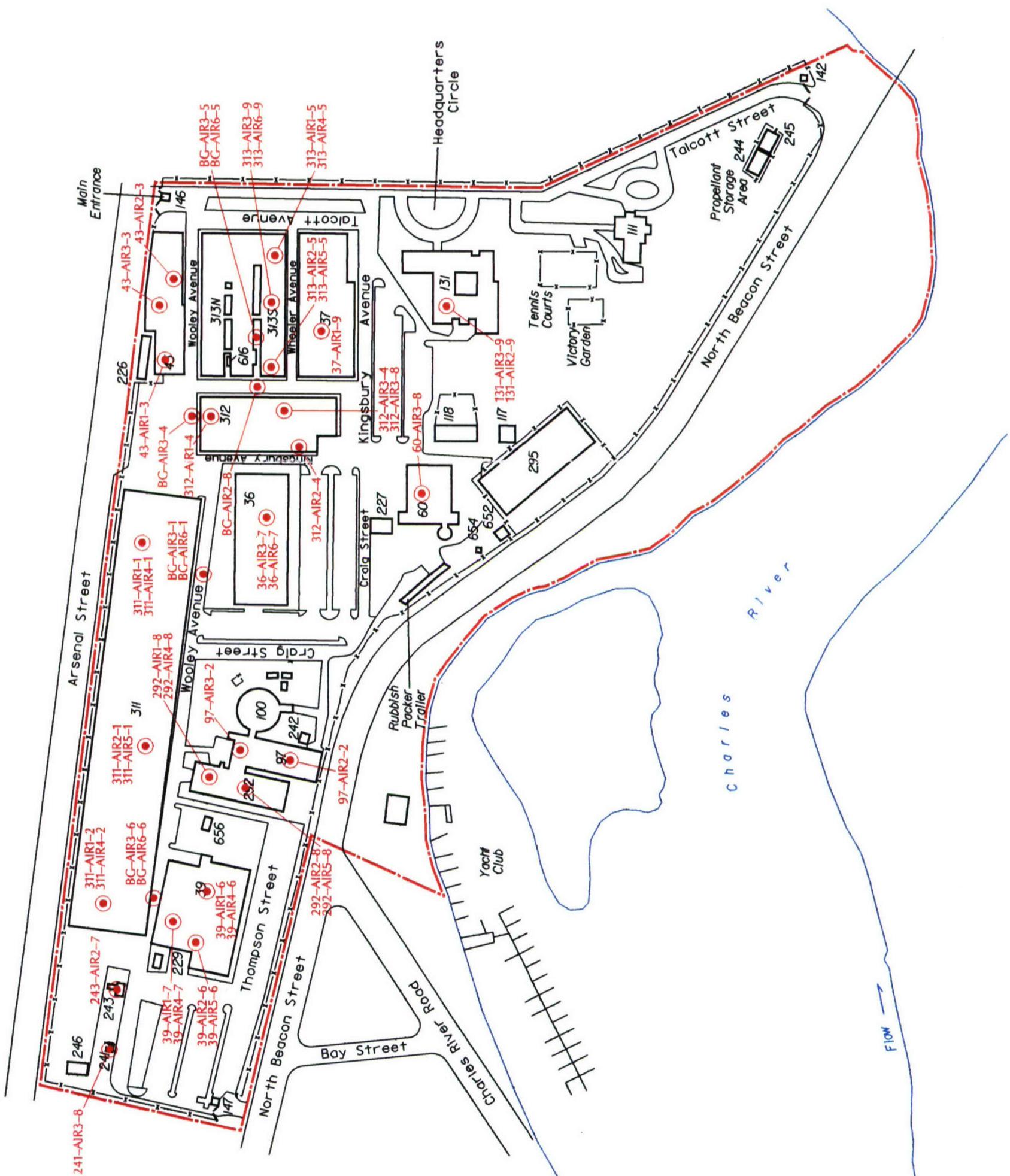
Figure 4-14
Phase 2
Air Samples

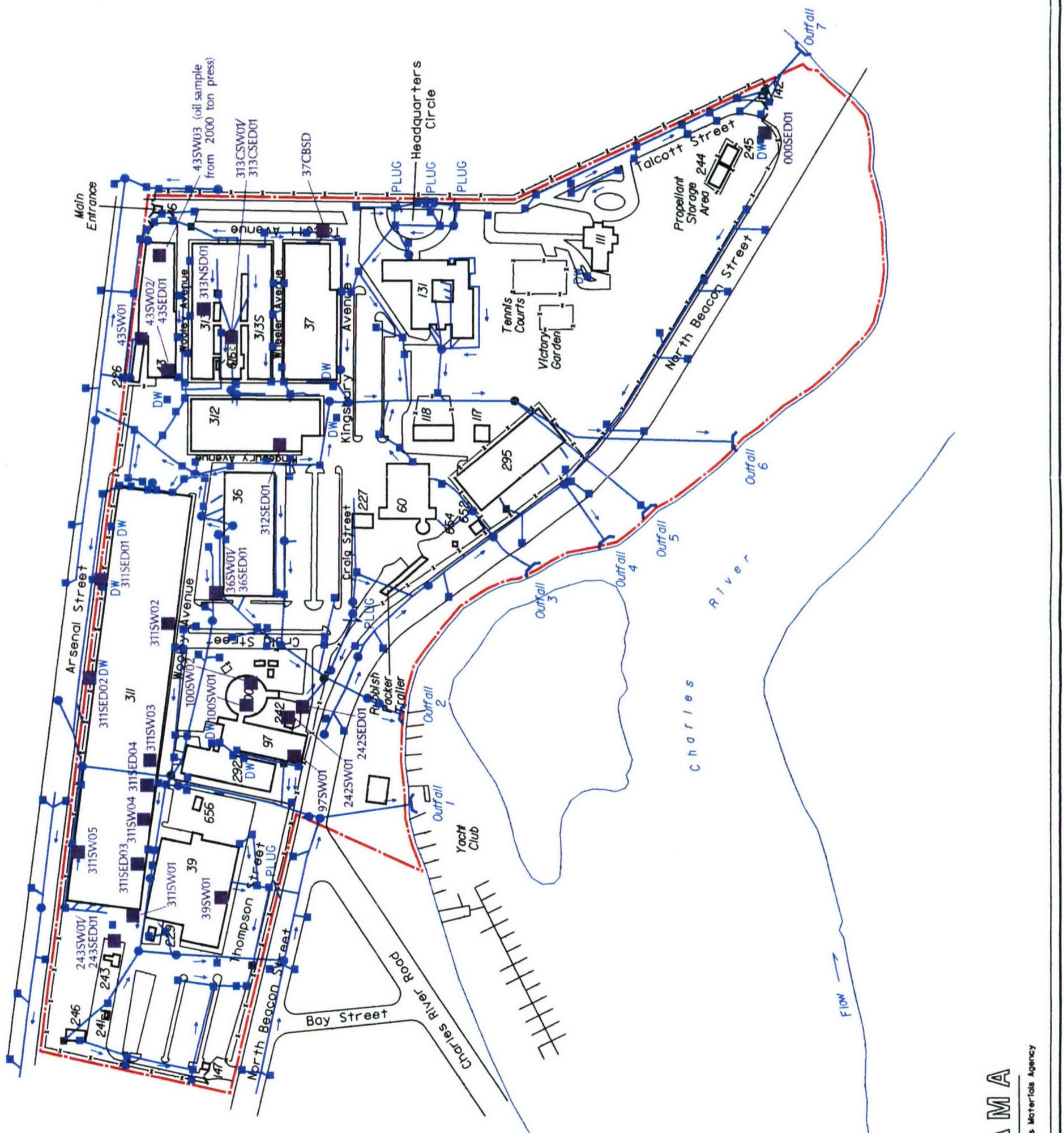
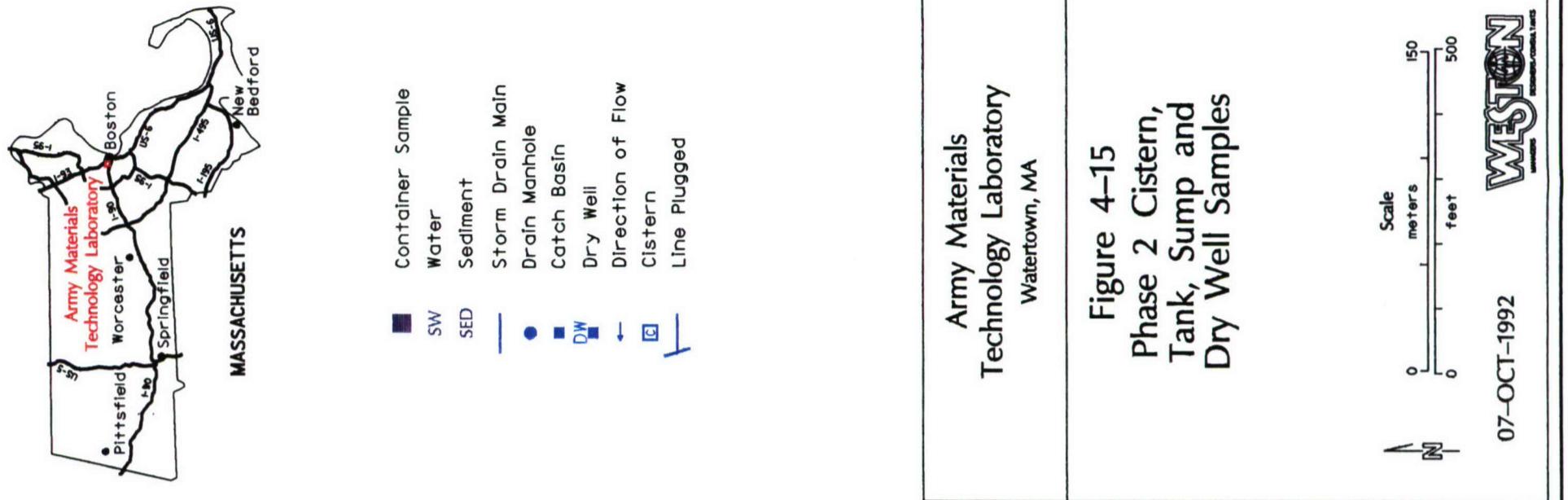
312-AIR3-4

A scale bar with two sets of markings. The left set, labeled 'meters', has markings at 0, 150, and 500. The right set, labeled 'feet', has markings at 0, 150, and 500. The scale is oriented vertically.

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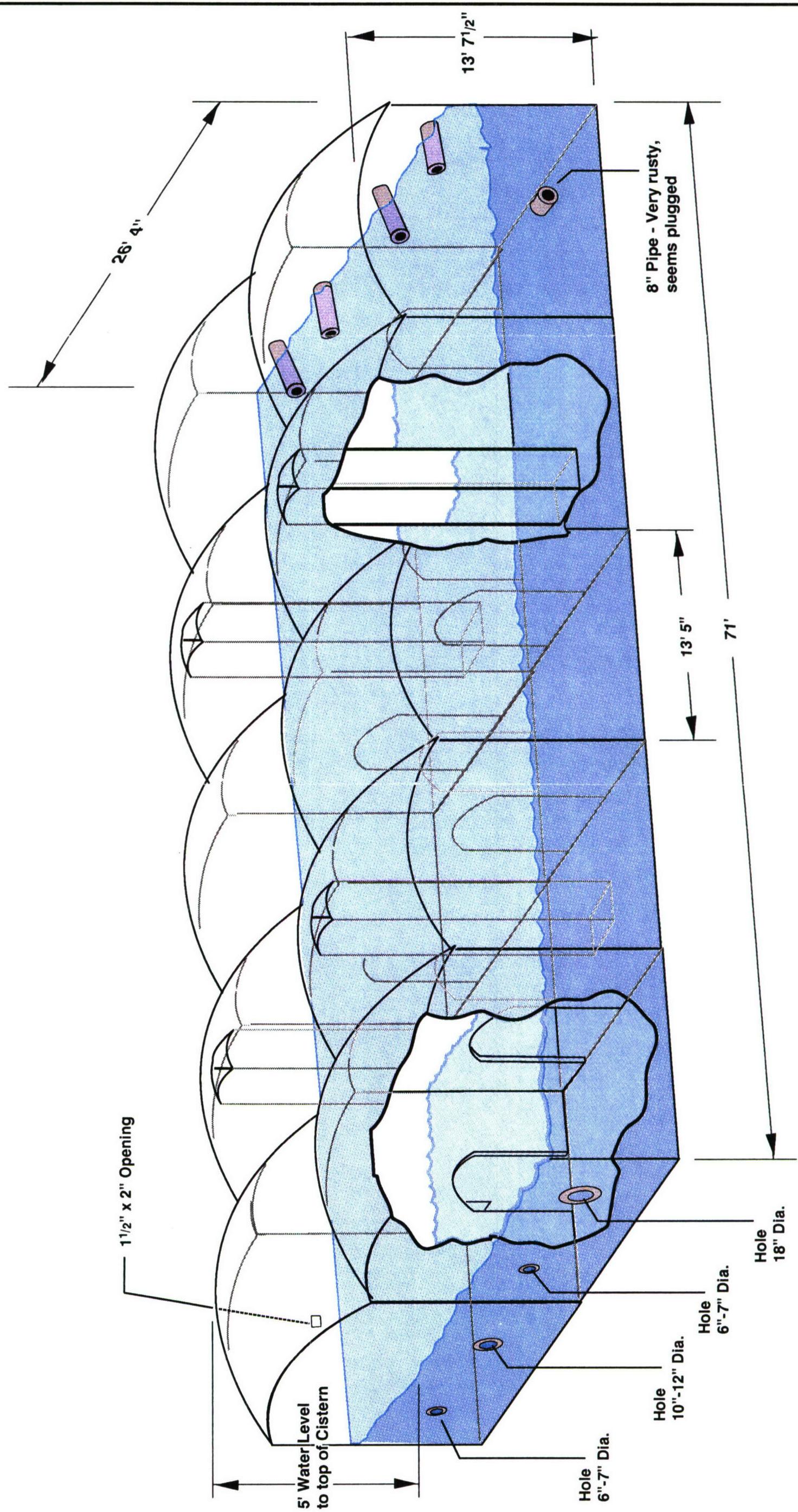
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Toxic and Hazardous Materials Agency



Note: Three dimensional drawing adapted from a plan view found in Appendix E of the Installation Assessment (THAMA, 1980). As with the source, dimensions and shapes of rooms are approximate. Vertical locations of pipes and depth to water are also approximate.

1146-8667 9/15/92

FIGURE 4-16
SCHEMATIC OF BUILDING 313C CISTERNS

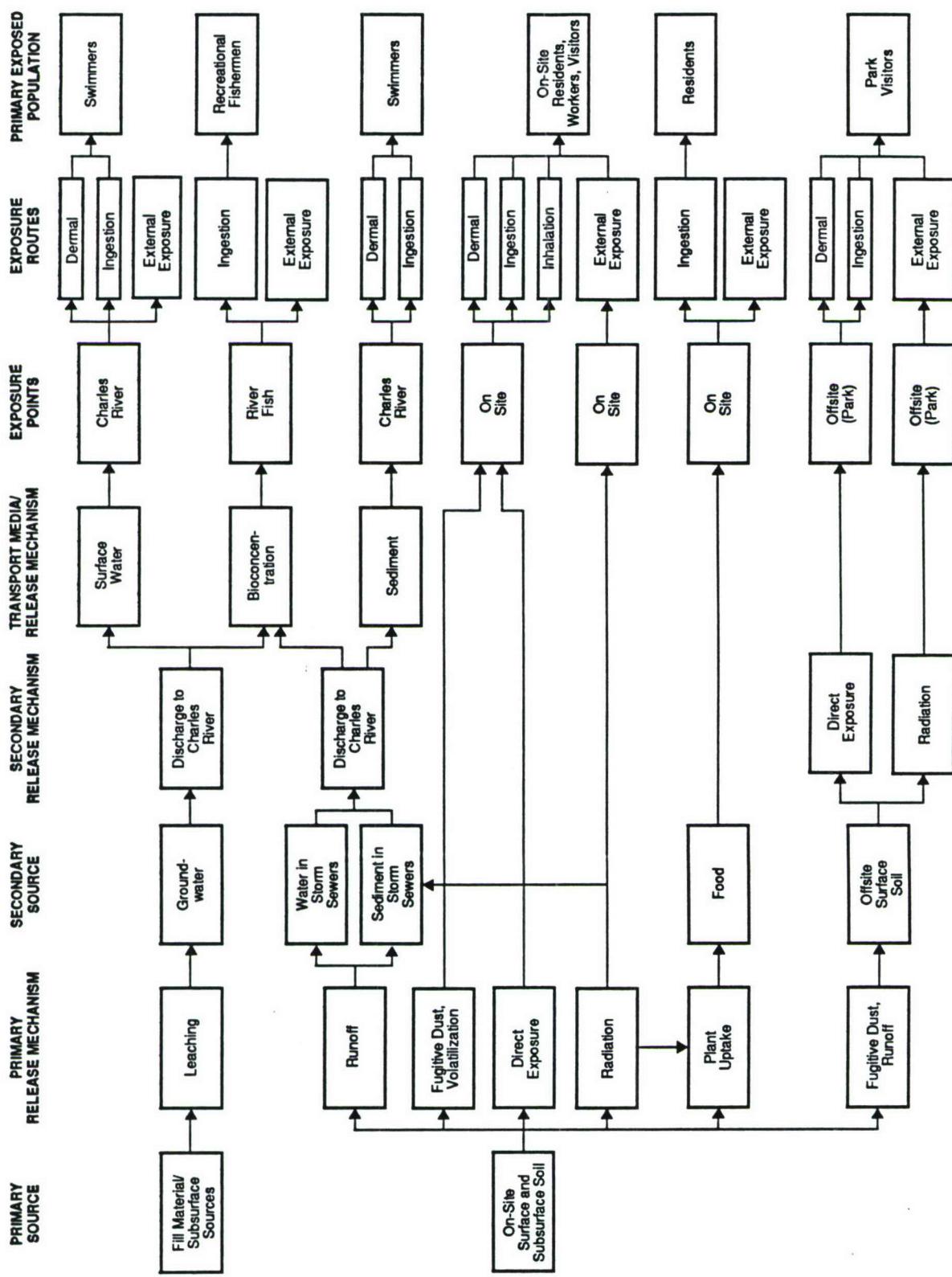
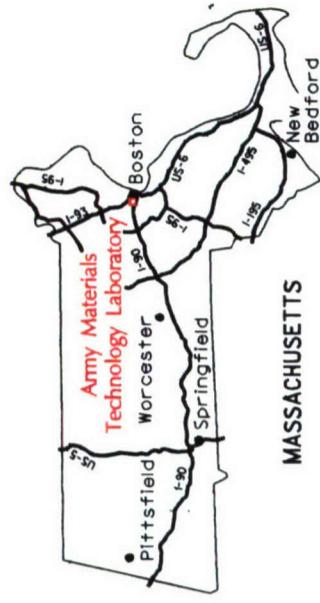


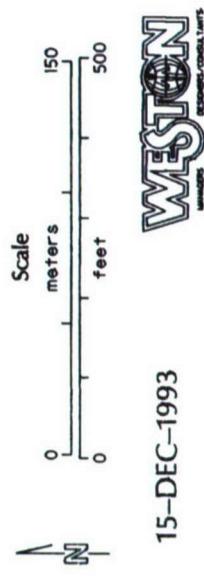
FIGURE 6-1 CONCEPTUAL SITE DIAGRAM FOR MTL BASELINE RISK ASSESSMENT



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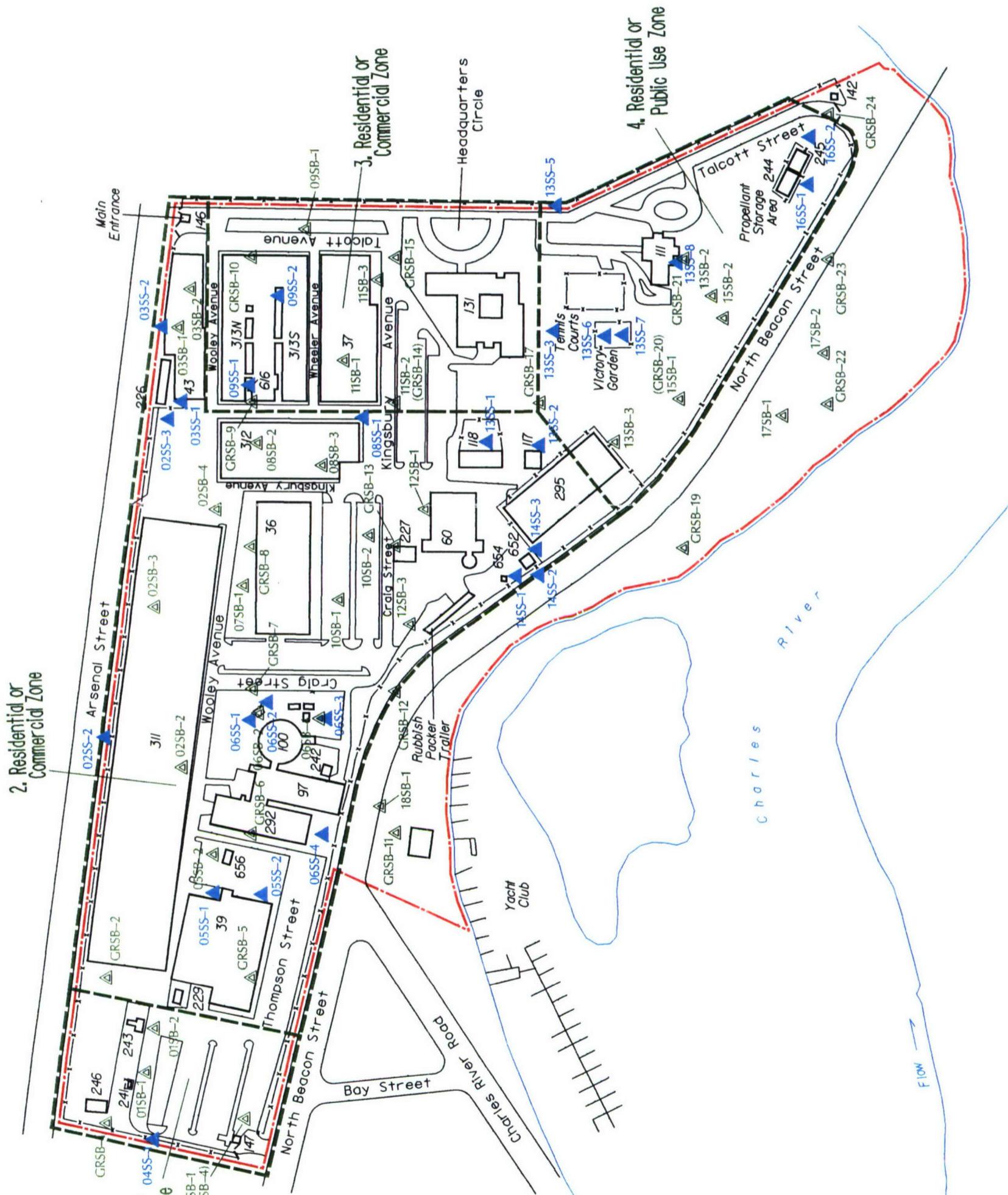
**Figure 6-2
Likely Future Reuse
Zones at the MTL Site**

Source: Watertown Arsenal Reuse Study, May 1993
Note: Zones 1 and 2 recently changed to commercial reuse only (Watertown Arsenal Reuse Study, November 1993)



15-DEC-1993

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Environmental consulting services



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